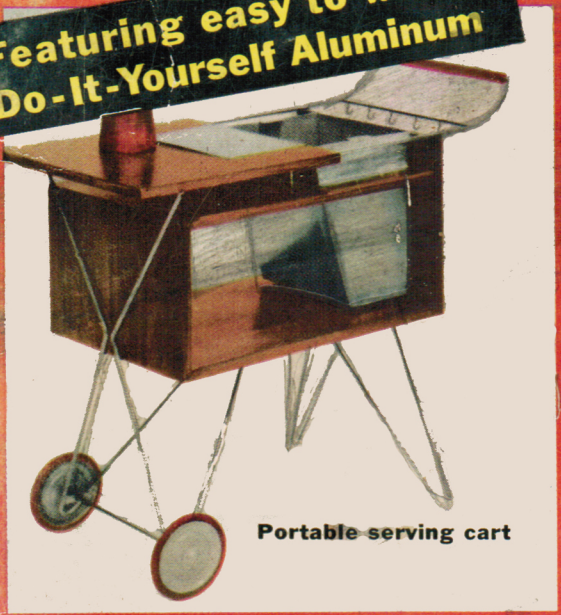
A FAWCETT HOW-TO BOOK 75¢
257

MAKE IT WITH ALUMINUM

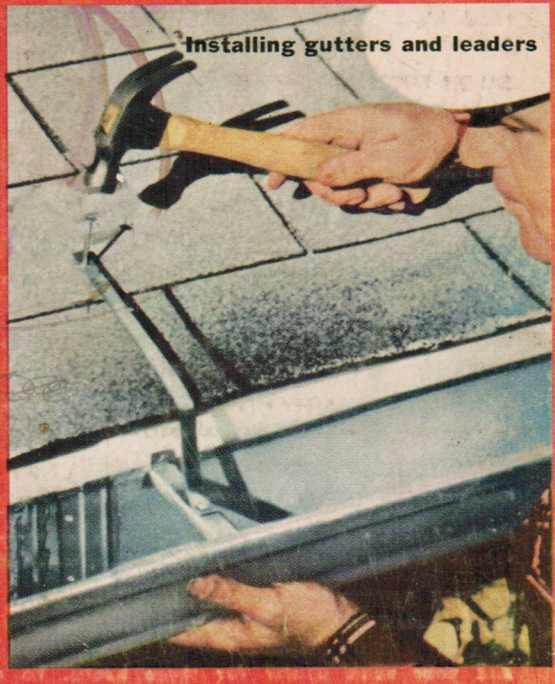
Featuring easy to work, Do-It-Yourself Aluminum



Portable serving cart

Cocktail table

Modern desk

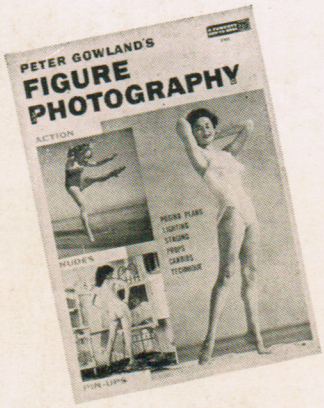


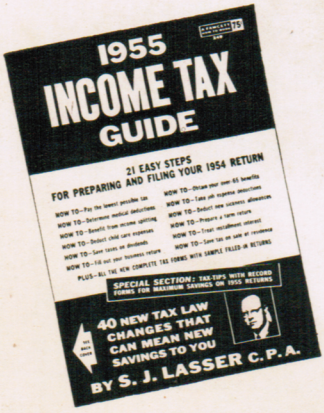
Installing gutters and leaders

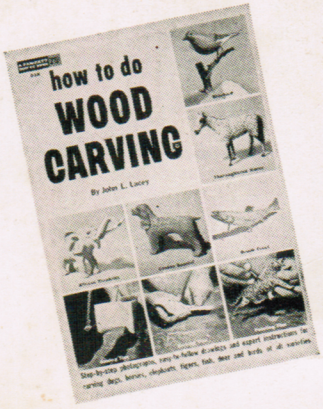
How to make combination screen-and-storm windows • Storm and screen doors
Sliding bathtub enclosure • Shower door • Modern furniture

FAWCETT HOW-TO BOOKS

AT YOUR FAVORITE NEWSSTAND







Peter Gowland's FIGURE PHOTOGRAPHY • Over 200 spectacular pin-ups, glamour, figure studies. (No. 250)

1955 INCOME TAX GUIDE • S. J. Lasser, famous authority, explains recent tax law changes. (No. 249)

* How To Do WOOD CARVING • Step-by-step photos, templates for carving popular birds, animals. (No. 248)

Handy Man's Indoor & Outdoor PLYWOOD PROJECTS • Furniture, built-ins, remodeling, building. (No. 245)

SALON PHOTOGRAPHY • Glamour, distortions, nudes, available light, children, candid, club news. (No. 243)

* Frank Ellison on MODEL RAILROADS • The dean of modelers complete book for RR fans. Photos. (No. 242)

*How To REFINISH FURNITURE • New and old surfaces, brush, spray finishing, repairs, remodeling. (No. 236)

Lucian Cary on GUNS • All new! Shotgun clinic, trap and wing shooting, rifles, scopes, gun care. (No. 238)

BUILD IT • More than 50 home workshop projects in how-to photos, construction drawings, text. (No. 240)

GOOD PHOTOGRAPHY • Fabulous photos by the best photographers. Nudes, glamour, children, pets. (No. 235)

*INVENTOR'S HANDBOOK • Patents, copyrights, trademarks, venture capital, inventors' markets. (No. 233)

HI-FI Manual • Speakers, amplifiers, tuners, pickups, turntables, tape recorders. Fully illustrated. (No. 232)

* STOCK BUYING Guide • Stocks for income, growth, safety; mutual funds, penny stocks. Photos. (No. 231)

* 100 HOUDINI TRICKS You Can Do by DUNNINGER • Card, coin, parlor, stage illusions. Photos. (No. 228)

PRIZE WINNING PHOTOGRAPHY • Top national winners. Nude, portraits, children, press, candid. (No. 227)

*HANDY MAN'S HOME MANUAL • Latest edition of a famous favorite. Repairs, maintenance. (No. 224)

How To Play BETTER GOLF • Famous champion Lloyd Mangrum will lower your score. Many photos. (No. 223)

* Handbook of TV REPAIR • Tube testing, tools, UHF, color TV, antennas, fringe area reception. (No. 222)

*ARCHERY HANDBOOK • Target shooting, hunting, bow and arrow making, equipment. How to shoot. (No. 221)

PHOTOGRAPHY HANDBOOK • Big how-to-do-it section, darkroom aids, figure studies, salon photos. (No.220)

* PIONEER RAILROADING • From early history to 1870. Civil War, transcontinental. Illustrations. (No.219)

* LOW COST HOMES • Ranch, split-level and two-story homes you can build. Plans available. Photos. (No. 217)

AUTO RACING Yearbook • Big cars, stock, sprint, midget, sports cars. All top circuits, runs. (No. 216)

* Build Your Own MODERN FURNITURE • Tables, beds, chairs, cabinets, chests, desks. Finishing. (No. 215)

How To Use POWER TOOLS • Portable and bench tools for wood, metal. Plus multi-purpose tools. (No. 212)

How To Build 20 BOATS • Complete building plans for outboards, inboards, auxiliaries, canoes. (No. 211)

Ask your news dealer for these books. To order direct, send 75c plus 10c mailing charge, per copy to: FAWCETT BOOKS, Dept. 257, Greenwich, Connecticut. Specify issue number. Books marked with an asterisk (*) available in hard cover De Luxe Edition at $2.00 each.

A FAWCETT HOW-TO BOOK 75¢

MAKE IT WITH ALUMINUM

A FAWCETT BOOK • NUMBER 257

LARRY EISINGER • EDITOR-IN-CHIEF • FAWCETT BOOKS

GEORGE TILTON • MANAGING EDITOR

W. H. Fawcett, Jr. . . . . President

Roger Fawcett . . . . . General Manager

Gordon Fawcett . . . . . Secretary-Treasurer

Roscoe Fawcett . . . . . Circulation Director

Ralph Daigh . . . . . Editorial Director

James B. Boynton . . . . . Advertising Director

Al Allard . . . . . Art Director

Ralph Mattison . . . . . Assistant Art Director

Lee Wilson . . . . . Production Director

FRANK K. COFFEE . . . . . EDITOR

HAROLD KELLY . . . . . ART EDITOR

Nick Carlucci . . . . . Art Associate

Silvio Lembo . . . . . Art Associate

Jack Borgen . . . . . Art Associate

Bob Thornton . . . . . Art Associate

Donn Clingen . . . . . Art Associate

Harry Matetsky . . . . . Art Associate

Murray Cooper . . . . . Art Associate

Jean Galloway . . . . . Associate Editor

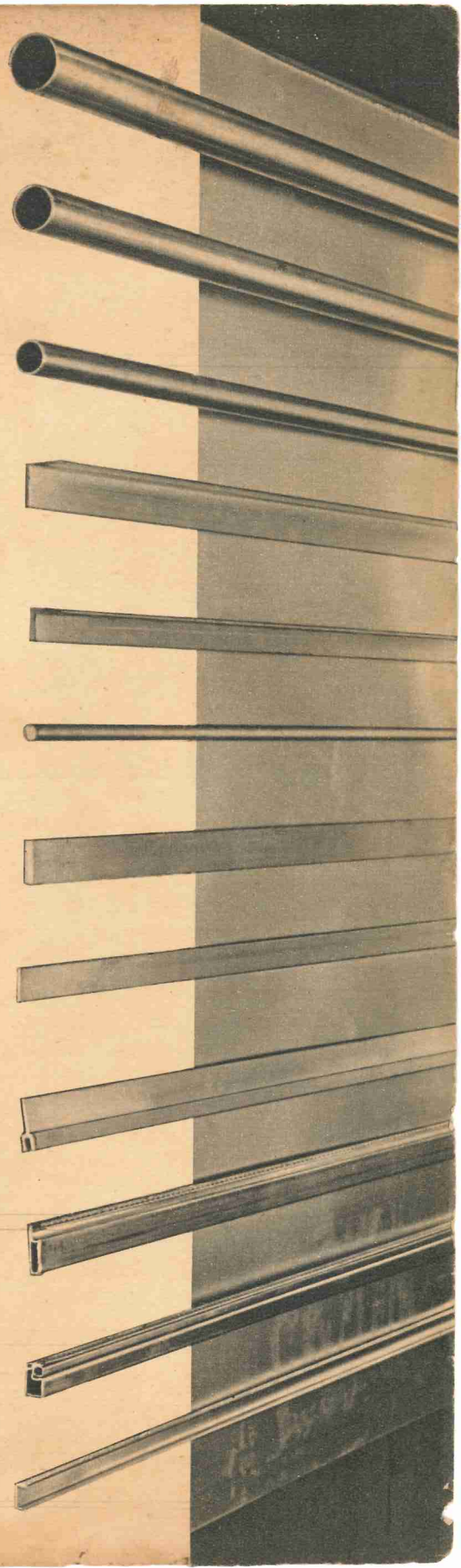
Anne Buccheri . . . . . Production Editor

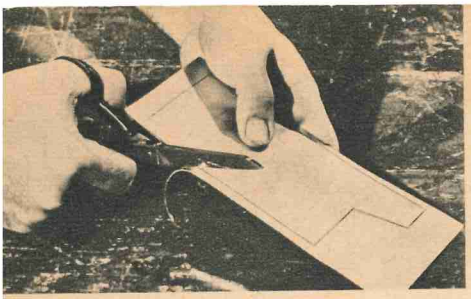
MAKE IT WITH ALUMINUM, Fawcett Book 257, is published by Fawcett Publications, Inc., Greenwich, Connecticut. Editorial and Advertising Offices: 67 West 44th Street, New York 36, New York. General Offices: Fawcett Building, Greenwich, Connecticut. Trademark of Fawcett Publications, Inc. Printed in U.S.A.

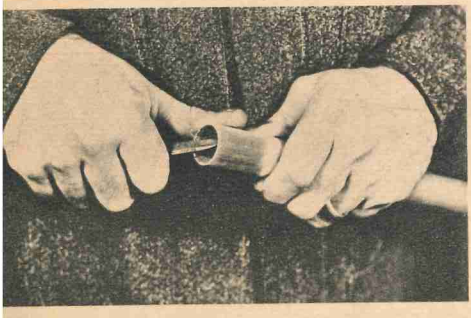
Much of the material in this volume was prepared through the co-operation of the Reynolds Metals Company, of Louisville, Kentucky.

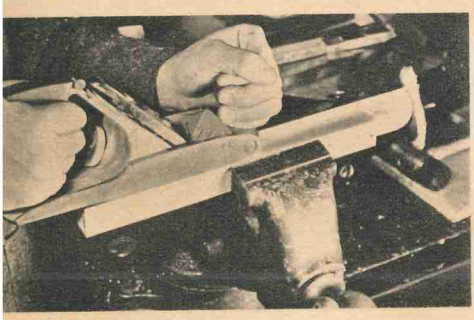
The following projects are copyrighted by Reynolds Metals Company: Screening-in a Porch or Breezeway, Lawn Furniture, Serving Cart, Fireplace Set, Room Divider, Nesting Table, Occasional Chair, Modern Desk, Coffee Table, Inlaid Walnut Coffee Table, Table Lamp, Floor Lamp, Artist's Drawing Table, File Desk, Study Desk, Miscellaneous Gift Items.

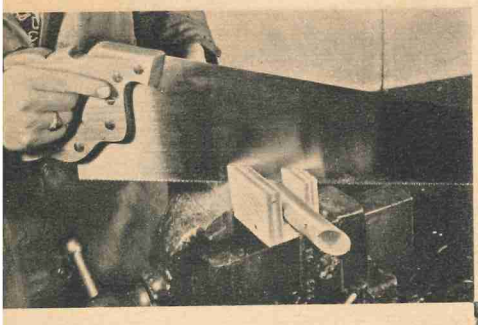
The editors are deeply appreciative of the very generous assistance provided by the personnel of Reynolds Metals Company, especially of the Messrs.: C. F. Manning, Vice President, Product & Market Sales Development; Keen Johnson, Vice President, Public Relations; John Fox, Do-It-Yourself Project Director; C. M. Mapes, General Manager, Consumer Markets; William Miller, Do-It-Yourself Workshop Technician; James Howe, Do-It-Yourself Advertising.



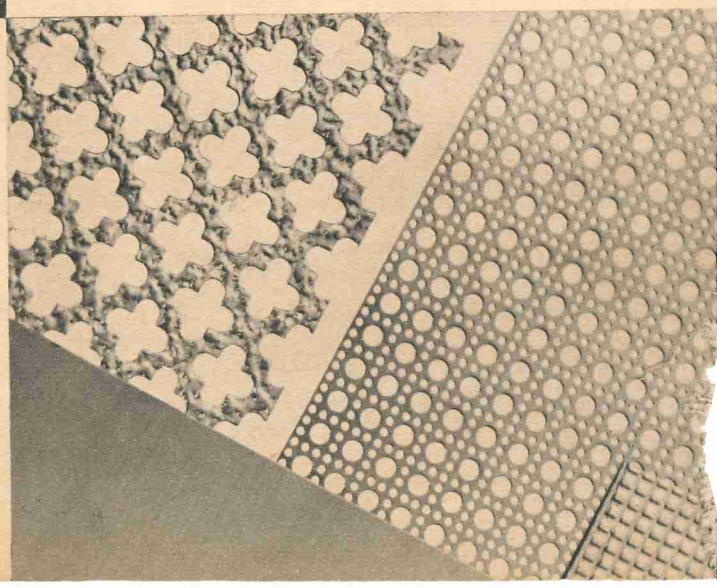








Contents



Cover photos: Portable Serving Cart, Cocktail Table, and Modern Desk—from Reynolds Metals Company; Installing Gutters and Leaders, by David X. Manners.

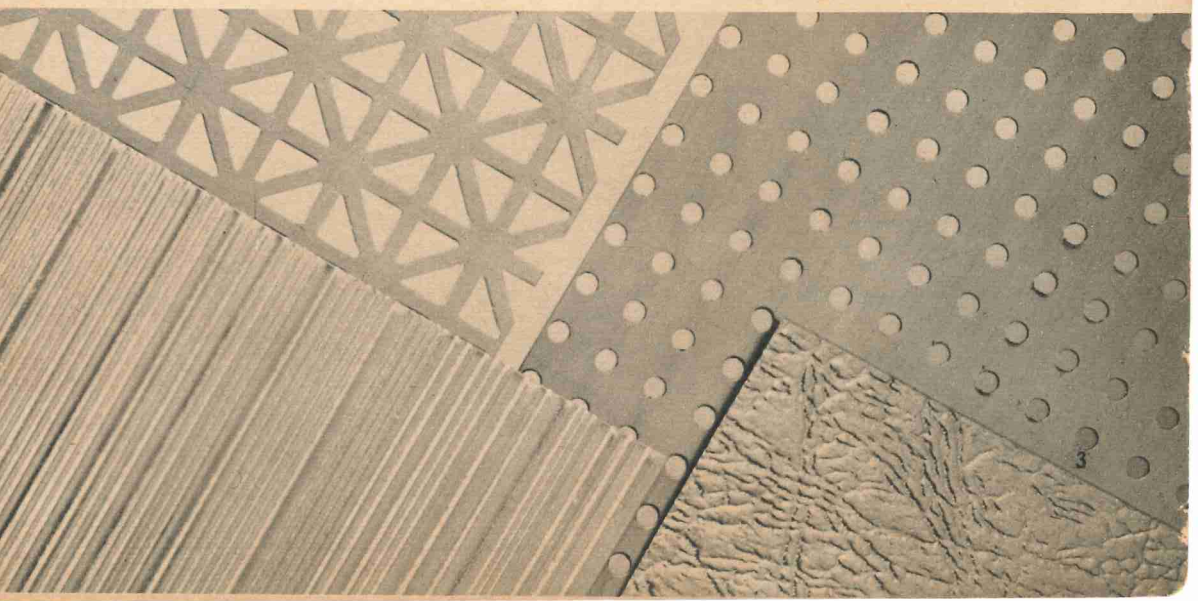
DO-IT-YOURSELF ALUMINUM

Do-It-Yourself Aluminum is a new type of aluminum specially designed for home use. It has all the beauty, rustproof qualities, and sturdiness of industrial aluminum, but it is specially engineered for astonishing workability. It is something the family mechanic and craftsman has wanted for a long time—a metal which can be worked with ordinary household tools.

What is it like? Well, you can cut the sheet aluminum with a pair of household scissors. You can whittle the bars and tubes with a pocket knife. You can plane it with your own block or smooth planes. Power tools can be used on it. Light, strong, and sleek-looking, you'll find this metal to be endlessly useful.

Hardware stores everywhere are carrying it in shapes which have been carefully designed for do-it-yourself enthusiasts. If you're one of the millions of people who at one time or another have backed away from a "tough" home-repair problem because it involved the use of metal, you'll undoubtedly change your mind now. Its countless uses will soon make it commonplace in the home workship.

This metal also offers creative possibilities for the craftsman which are almost limitless. Just laying a sheet of this metal on your workbench is an invitation to creative work. Ideas for new projects, adaptations on old ones, designs no one else has yet thought of, will pop into your head and you'll find yourself reaching for a pencil and rule almost automatically. Regardless of age or sex, people who like a creative medium will enjoy working with the new do-it-yourself aluminum.



The Magic Metal

Do-It-Yourself Aluminum is a far cry from the aluminum in the pots and pans that were your grandmother's pride and joy.

STRANGE as it may seem, one-twelfth of the earth's crust is aluminum, which is almost twice as much as iron, the second most plentiful metal. Yet aluminum is never found free in nature like gold or silver. It is always combined chemically with other elements, which makes it extremely difficult to obtain metallic aluminum, as we shall see.

Nearly all common rocks and clays contain aluminum. Certain red clays contain a rather high proportion of alumina (aluminum oxide). Even the foods we eat contain traces of aluminum.

Because of the long chemical process involved, it is not practical to extract the aluminum unless a rather large proportion is present. Thus only ores having a high alumina content of around 50 to 60 per cent are used. The best of such ores are called "bauxites," being named after the town of Les Baux in southern France where one of the first deposits was found. In this country, the principal producing areas are in the states of Arkansas, Georgia, Tennessee, and Alabama. Bauxite is mined underground like coal and also by strip or open-pit mining like iron ore.

But before we can get metallic aluminum, it must be separated from the other elements present. Essentially, two basic processes or steps are used. The first one, a chemical and precipitating process, converts bauxite to aluminum oxide, called "alumina." The second process, an electrolytic reduction, breaks the alumina down into molten aluminum and oxygen.

It takes roughly four tons of bauxite to make two tons of alumina, which results in a single ton of metallic aluminum. But to make this ton of aluminum, some 1300-1500 pounds of carbon are consumed as well as approximately 20,000 kilowatt-hours of electricity, which is enough to keep a 25-watt light bulb burning night and day for more than 91 years! No wonder the aluminum industry is the world's largest user of electric power!

The molten aluminum that results is drawn off and ladled into molds to cool and solidify. These rectangular-shaped chunks of raw aluminum are called "pigs," and usually weigh around 55 pounds each.

The pigs are later remelted for further refining to remove impurities and to permit alloying by adding other elements such as

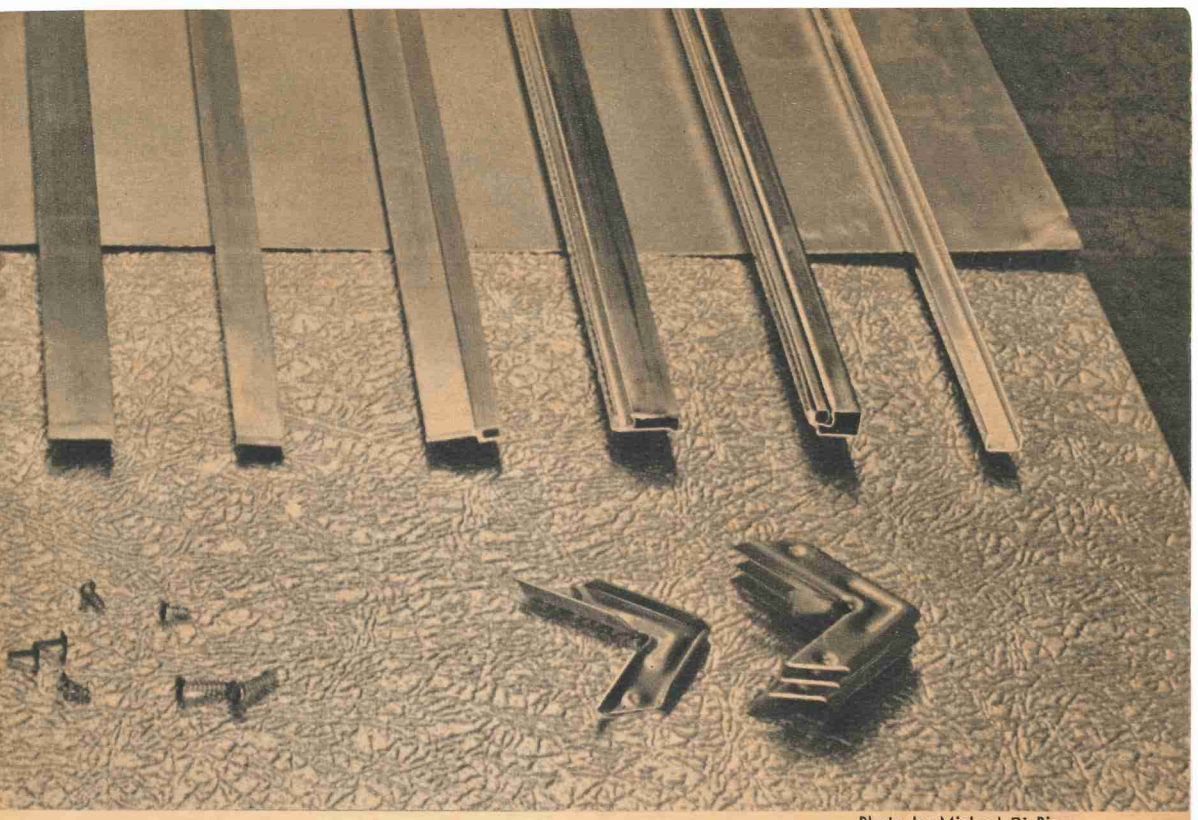


Photo by Michael Di Biase

Do-It-Yourself Aluminum comes in a great variety of shapes and sizes, from plain and embossed sheet to tubing, angle, rod, and bar. Extruded shapes include storm sash, and screen frame member using plastic or aluminum spline. Hardware includes corner locks, machine screws, wood screws, and rivets.

copper, silicon, magnesium, manganese, zinc, tin, nickel, chromium, titanium, lead, and bismuth. These may be added in various combinations and proportions to produce aluminum alloys having a wide range of characteristics and properties.

Depending on intended use, the refined or alloyed aluminum is re-cast in varying size ingots, weighing up to 4,000 pounds or more. Aluminum sheets are made from slab (flat, rectangular) shaped ingots. Before rolling down into sheets, the outer surface containing poor quality metal is pared or cut off in a huge machine called a "scalper." The slab is heated to soften it for working and then is passed through a series of powerful rollers which reduce it to the thickness desired. Hot rolling is not carried below a thickness of ⅛ inch. Thinner sheets are made by rolling while the metal is cold. This produces a better finish and increases strength and hardness.

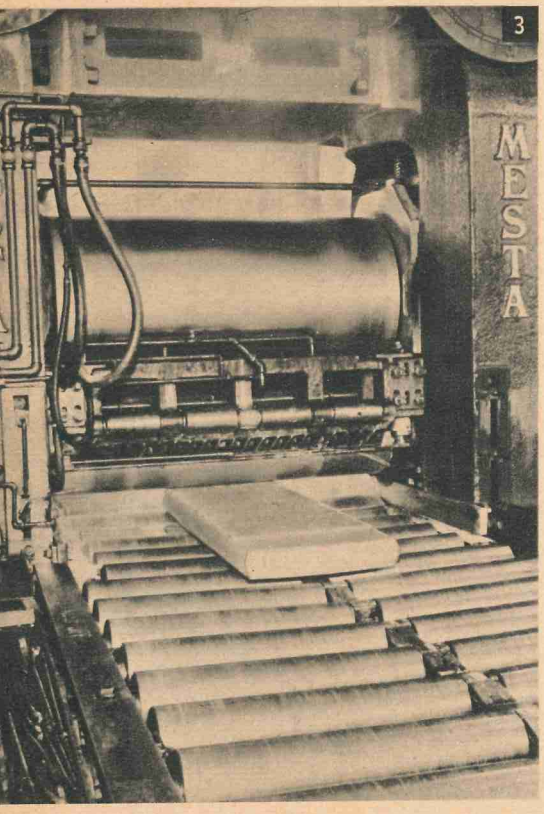
Since continued cold working may make the metal too hard for further rolling, it is usually necessary to soften it by annealing (a form of heat treatment) before the final thin sheet desired can be obtained. Otherwise the metal may become so hard that it becomes impractical to roll it as thin as may be desired.

Making aluminum rod and bar (cross section of rod is round; bar may be square, hexagonal, octagonal, rectangular, etc.) is done by a similar process in which castings are heated to soften them and then fed through pairs of rollers with succeedingly smaller openings to reduce the cross section of the ingot gradually as it lengthens.

To get wire, hot rolling is continued until the rod is about ⅜-inch in diameter. From there on down, it is worked cold and made smaller by pulling it through a series of dies. Each die reduces the diameter slightly. Holes in diamonds may be used for drawing real fine wire.

When structural shapes like I-beams, angles, or channels are wanted, the hot ingot is squeezed between rolls which have been cut out to give the metal the desired shape.

For unusual and specially shaped cross sections, like storm sash and screen frame section, a hot billet is put in a huge hydraulic press and squeezed out through a die whose opening has the shape desired, just like squeezing out a ribbon of tooth-

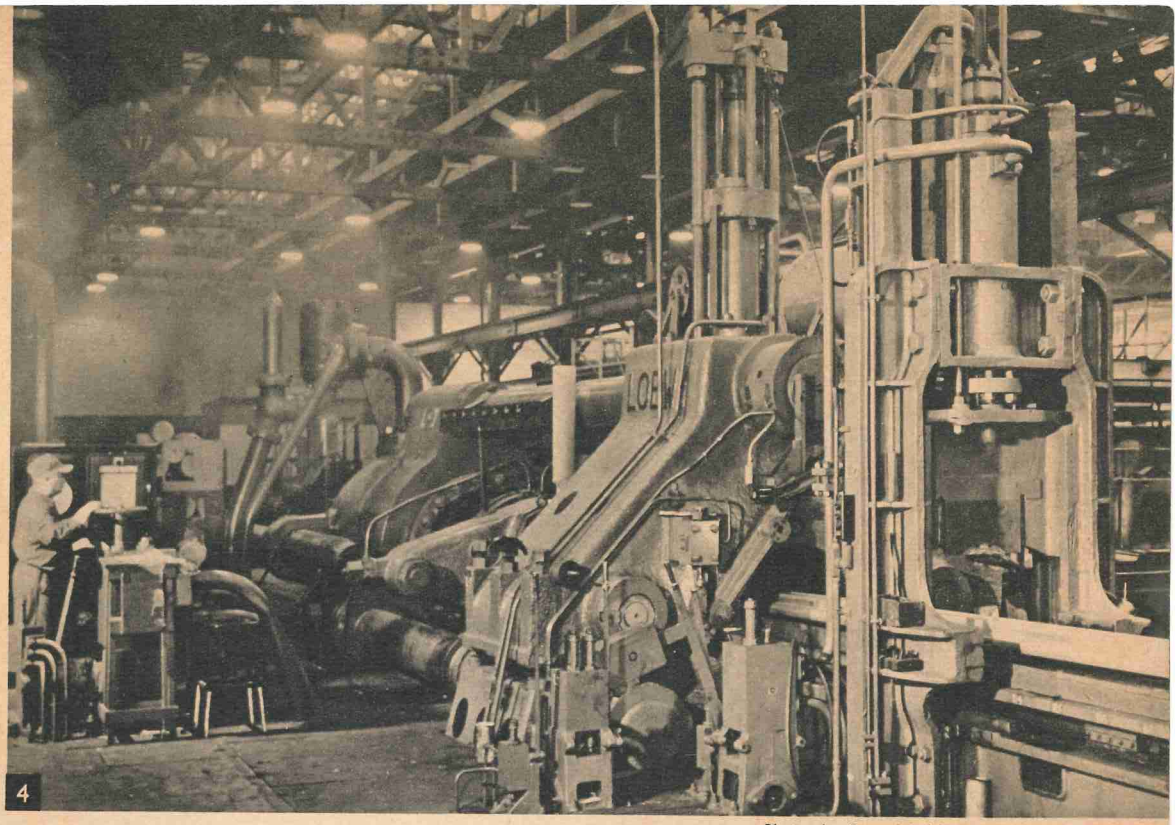


1 Bauxite, the raw material from which aluminum is obtained, is mined underground, much like coal, and also by strip or open-pit mining like iron ore.

2 The molten aluminum that results from the lengthy and expensive reduction process is drawn off and ladled into individual molds to cool and solidify.

3 The aluminum, cast as ingots, is then passed through powerful rollers under great pressure to reduce the slab to whatever shape and thickness is desired.

4 To form irregular shapes such as storm and screen sash members, hot aluminum is squeezed through steel dies under pressure in giant extrusion presses.



Photos by Reynolds Metals Company

paste. Since almost any shaped hole can be cut in the die, it is possible to produce a bar of aluminum having almost any cross section desired. This process is called "extrusion."

Aluminum powder for making aluminum paints is produced by several methods: hammering, atomizing, and ball milling. Atomizing is the most interesting. Here molten aluminum is allowed to flow around a nozzle through which a powerful stream of hot air is forced upward. The molten aluminum is sprayed up into a big vertical pipe where it hardens into small particles as it cools.

Particles produced by atomization are more or less spherical in shape. If flat, flake-like particles are wanted, they can be obtained by putting the atomized powder into a ball mill. This is a large cylinder filled with specially hardened steel balls. As the cylinder is rotated, these balls fall against the side of the drum, hammering the powder into small flakes.

Such flakes are particularly desirable for aluminum paint because of their tendency to "leaf"; that is, they float to the top of the paint film in a direction parallel to the surface and overlap just like fallen leaves. This is a valuable characteristic because it provides almost a solid metallic film at the top of the paint film; in effect giving two films for one. Also, since the metallic flakes themselves are impervious to moisture, their close overlapping provides an extremely effective moisture barrier.

The clear, colorless, protective oxide film on aluminum provides a permanent and highly attractive finish. For most projects, aluminum needs no paint or other finish whatever. This eliminates the need for elaborate and expensive finishes often required with other metals.

Where a special finish is desired, aluminum can be given a mechanical finish by grinding, polishing, buffing, scratch brushing, burnishing, tumbling, sandblasting, embossing, spin finishing, highlighting, hammering, and fluting.

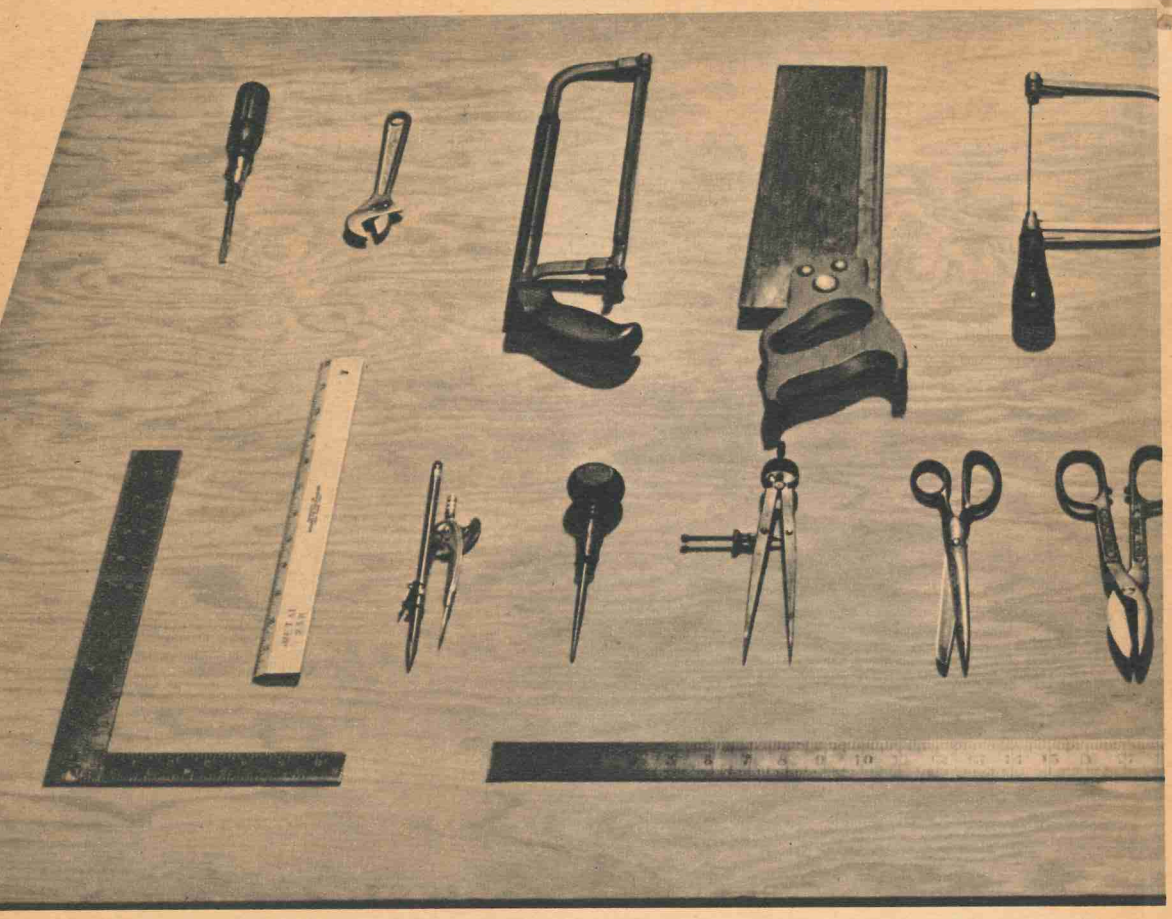
Various other finishes can be produced by chemical treatments. A wide variety of paints, lacquers, enamels, and varnishes can also be used.

Immunity to rust, rot, and vermin combine in aluminum to provide a material with an exceptionally long service life.

Aluminum, the Modern Metal, has long been indispensable in industry. Now, with the development of this new, magic alloy, Do-It-Yourself Aluminum, exciting new fields have been opened for the home craftsman—its countless uses will soon make it commonplace in the home workshop. •

Working with Aluminum

By William E. Moore



YOU'LL not have to borrow any fancy tools from your friends and neighbors to work this metal. Nor will you have to make any special, last minute trips to the hardware store, to buy new ones. The tools you already possess, the common, garden variety tools now on your workbench, will do the job. If you are an experienced craftsman or mechanic and have a large assortment of tools, you'll find that some will do a better job than others. The things you want to make, your own experience, and the suggestions presented here, will all help you decide which ones to use.

MARKING TOOLS

The first tools you'll use on this metal will be the ones which will help you make a drawing or layout. An ordinary ruler, a pencil, and a ten-cent pencil compass will suffice on most small jobs. However, when you're tackling something big and you want to make a very accurate drawing, some kind of scratch awl, a pair of dividers, and a steel rule will give you the best results. The scratch awl (a sharpened ice pick or long nail are good substitutes) will make all your lines of uniform width.

You'll not need fancy tools to work this metal. The tools you already possess—the common, garden variety tools found on almost any workbench—will do the job.

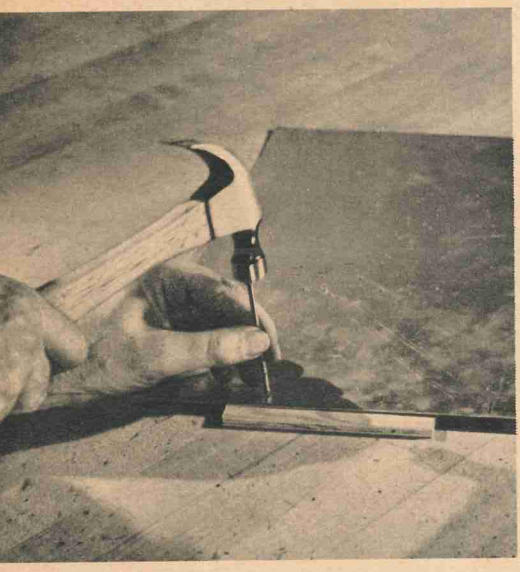
Photos by Michael Di Biase

Of course a scratch awl will make a permanent line which would spoil the appearance of some jobs. Consequently, a sharp pencil, rolled or turned as the line is drawn, often makes the best line possible. On shiny pieces of metal where reflected light makes it difficult to see small lines, a little Prussian blue (or chalk or crayon) will eliminate the glare. Prussian blue is simply a concentrated dark blue oil paint. Dilute it with plenty of turpentine. You can keep a small bottle of this around for years if it is stoppered or capped tightly. The Prussian blue can be purchased anywhere paint is sold. After the metal has been cut the paint can be easily removed.

You'll need a square to lay out and check corners. The flat steel square works a little better than the ordinary thick-handled square because it is in full contact with the metal on which it lies. All thick measuring tools, such as square, steel rule and folding rule, must be tipped up on edge when used for accurate measuring so that the markings touch the metal itself. The steel tape, however, a thin tool, can be used in the flat position with considerable accuracy.

When marking sheet aluminum, use a flat steel square to lay out and check corners accurately.

For marking out circles and arcs, an inexpensive pencil compass will suffice on most small jobs.



A center punch tapped lightly gives your drill point a resting place and guarantees accuracy.

Use rubber or rawhide mallet when forming sheet aluminum so as not to mar or scratch the metal.

CUTTING TOOLS

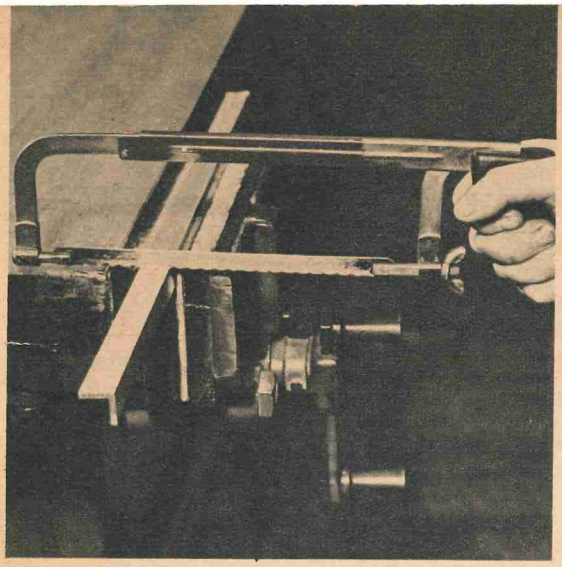
While any saw can be used to cut this aluminum, a good principle to follow is to use the one which has the most teeth per inch. Hacksaws, with 20 or more teeth per inch, do a wonderful job on tubes, rods, and bars and extruded shapes.

A coping (scroll or jeweler's) saw works well on irregular curved lines and in larger interior areas.

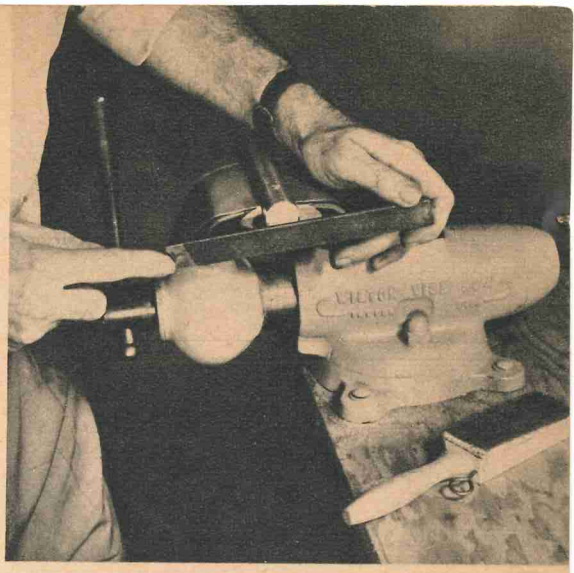
A light, short pair of combination tin snips (or a strong pair of household scissors) will cut both the plain and embossed sheets with the greatest of ease. Both a sharp cold chisel and a wood chisel are very useful in cutting out small interior areas.

A sturdy paring knife will also come in handy. Use it for small interior cuts on the plain and embossed sheets. Lay the sheets on a smooth block of wood first, though.

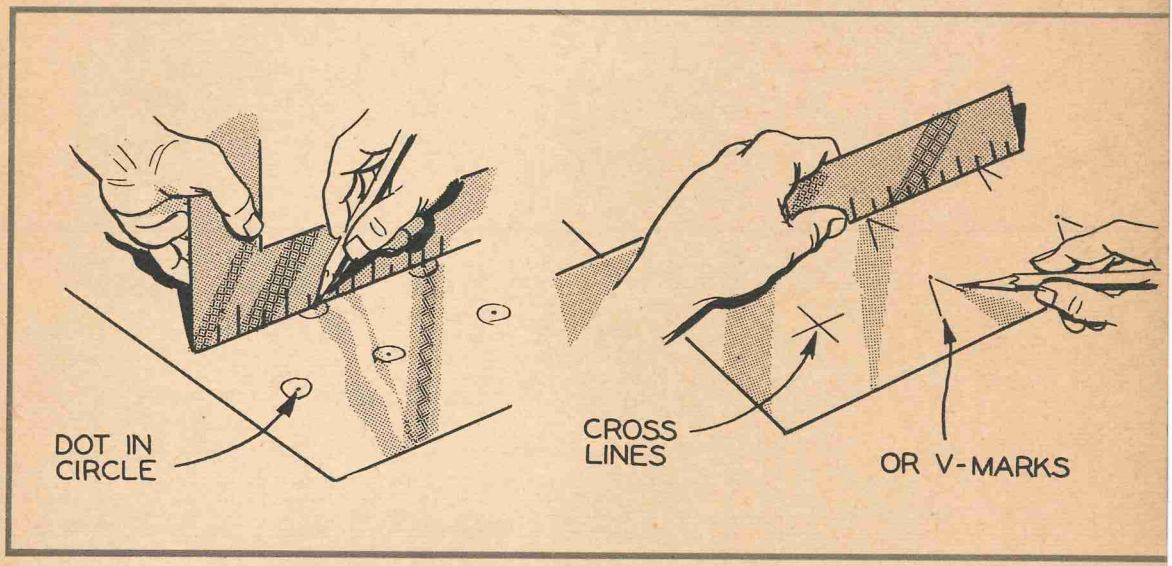
Files, particularly long-toothed single-cut files, which make a smooth shearing cut and which do not clog up with alumi-



Hacksaws, with 20 or more teeth per inch, do a wonderful job on rods and other extruded shapes.



A long-toothed, single-cut file makes a smooth shearing cut and does not clog up with aluminum.



num too quickly, are very effective cutting tools. You'll need a file card or brush to clean out the teeth of the files.

Your hand drill and a set of twist drills will prove ideal for drilling small rivet and screw holes. Larger holes can be drilled easily with an ordinary wood expansion bit. Regular auger bits in a carpenter's brace can be used also if the metal (especially the sheets) is backed with a piece of scrap lumber.

A center punch (or a nail) tapped lightly and only once into the metal at the exact place where you wish to drill a hole will give your drill point a resting place and guarantee drilling accuracy.

FORMING AND FASTENING TOOLS

Mallets of all kinds are useful in forming Do-It-Yourself Aluminum. However, rubber or rawhide, or any other soft-faced mallet will do the job without marring or scratching the metal.

As far as hammers are concerned, a light ball peen hammer does the best job on rivets and is also very useful in forming

shallow ash trays and in securing a hand-hammered effect, or planishing, as it is called.

Screw drivers and wrenches are necessary on screws and bolts and are used in the same way as on all other materials.

Many other tools not mentioned here will prove effective in working with this new material. You'll find that your own special "pets," tools you've used and liked for years, will "prove" themselves again with this new material.

LAYOUT SUGGESTIONS

Making a drawing or layout on Do-It-Yourself Aluminum is really easier than making layouts on many other materials. The smooth, clear surface it offers is an invitation to draw. The suggestions tendered here are S. O. P. (standard operating procedure) for most craftsmen. Use the suggestions which are applicable to your job or the procedure you are already using.

PLAIN AND EMBOSSED SHEETS:

Remember to tip your thick measuring tools on edge for accuracy of measurement. When marking with a pencil, make a definite point on the metal with either a V-shaped mark, the apex of which is the actual point, or make a small dot and then draw an easily recognizable circle around it. When marking with a scratch awl, a small dent or dimple can sometimes be made in the metal. Be sure, however, that these dents will not spoil the appearance of your job. Otherwise use a small scratch mark made in the direction of the line to be drawn, or a V-shaped mark as suggested with pencil above. Two intersecting lines will accurately mark the place at which a hole is to be drilled.

The edges of your sheet of metal are always straight and the corners square. Consequently, it's a good idea to begin your layout by measuring from one edge and corner. This will prevent unnecessary waste, too. You can also reduce errors and wastage by completing your layout before cutting into the metal.

Another method which often helps is to make a template out of paper, cardboard, or metal and then to draw around the template. This is a very sound idea when there are a number of identical pieces to be cut. However, be sure to make your template a fraction smaller than the finished project. This allowance is for the width of your marking tool (pencil or scribe) which is automatically added when you draw around anything.

Stencils can be made and used in the same way.

Carbon paper can also be used, of course, to transfer a design to a sheet of metal which is to be etched with acid or hand tooled.

TUBES AND RODS:

Marking tubes and rods is a simple matter. Any kind of tape—friction, adhesive or mastic—will serve to guide your saw or file.

Another device used successfully by many craftsmen is a narrow strip of aluminum sheet formed tightly around a tube. This resembles a hose clamp in appearance and effectively marks the tube for sawing. For final accuracy, of course, check with your square.

When several, or a large number of pieces are to be cut, a marking jig can be constructed in a hurry. Use a nail or a pencil fastened in a piece of wood while you rotate the tube or rod against it.

When marking a tube or rod which is to be cut at a 45° angle in a mitre box it will only be necessary to mark the outside limits of the pieces including enough material for finish filing. Sliding T-bevels can also be used to check angular cuts for accuracy. When laying out a hole in a tube for the insertion or joining of another tube, just cut a circular template of paper the size of the tube end. Paste or hold the template on the tube and draw around it. Be sure the template is not as large as the tube itself.

BARS AND EXTRUDED SHAPES:

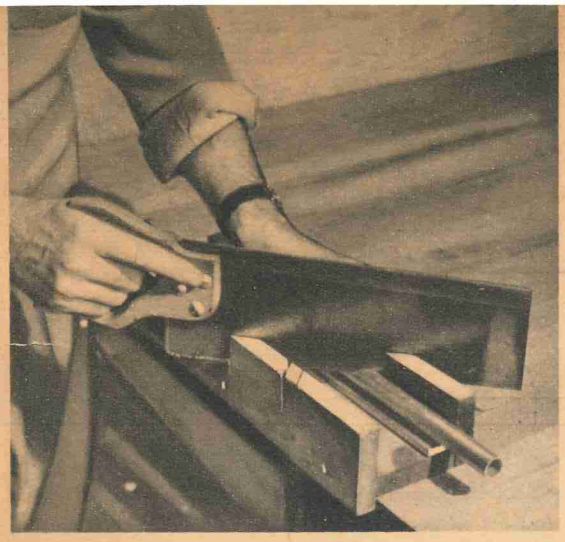
These items are the simplest of all to mark. Proceed as you do in wood work using a square or try square to mark completely around the bar. Forty-five-degree angles can be drawn on flat stock by drawing two lines which are exactly as far apart as the width of the stock. Then draw a diagonal line on which to saw.

When many pieces are to be cut at a 45° angle, such as when making screens or storm windows, you can construct a small mitre box and jig which gives you the proper angle as well as the correct length.

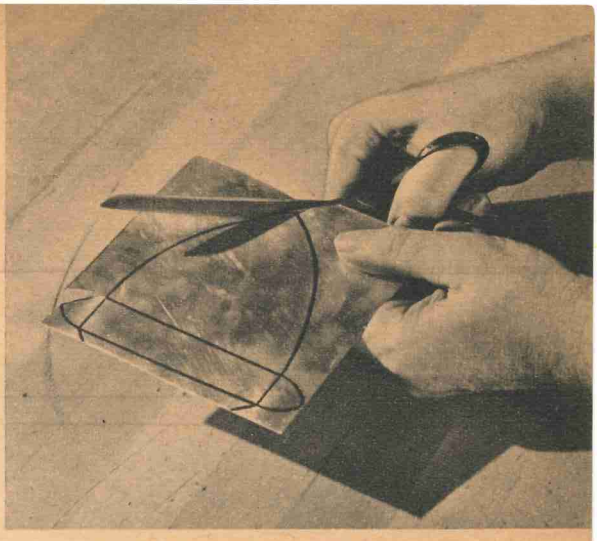
Your cut-off or mitre guide on your table saw can also be set at 45° and used, with both speed and accuracy.

TIPS ON CUTTING

When is a metal not a metal? When you're cutting Do-It-Yourself Aluminum. All the problems involved in cutting tough metals (or hard woods) are missing. Prac-

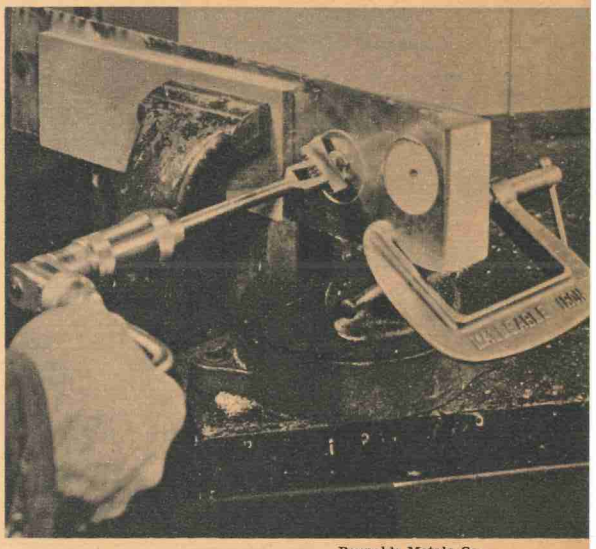


When sawing aluminum rods or tubes at an angle, use a simple mitre box for accurate angle cuts.



Use tin snips or a heavy pair of strong-jointed household scissors to cut out aluminum shapes.

When drilling holes in aluminum, back metal with scrap wood to prevent drill from cutting bench.



Reynolds Metals Co.

With metal backed with wood and clamped tightly, expansion bit can be used to make larger holes.

tically any cutting tool on your bench will do the job, but some, naturally, will do better than others.

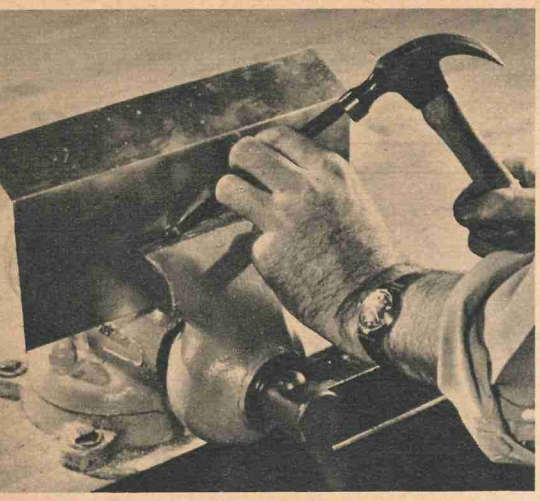
A pair of light combination tin snips, designed to cut straight lines as well as inside and outside curves, will serve effectively for general work. A special tool, called aviation snips or compound-lever snips, can be purchased for cutting either right or left-hand curves. These snips feature powerful cutting action and require very little effort to operate. However, a heavy pair of tight-jointed household scissors will also do a good job on straight lines and outside curves.

DRILLING

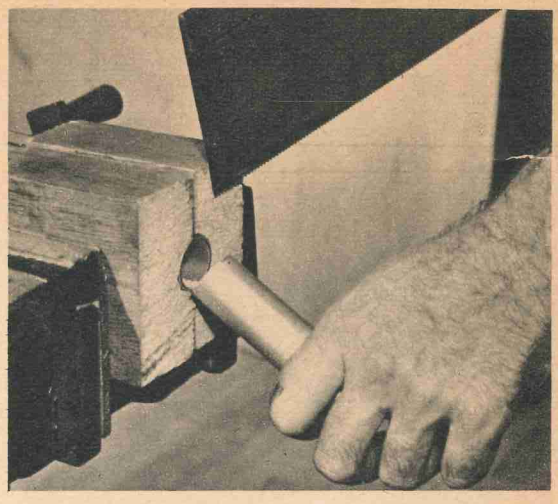
When drilling holes in this metal with a hand drill, simply place a smooth scrap of wood beneath or in back of it. This will prevent the drill from cutting your bench or your metal from being bent. If it is a small piece of metal which you are drilling, either place it in a vise with a scrap piece of metal or wood over the vise jaws, or drive a nail into the scrap drill block, to prevent the piece from spinning.

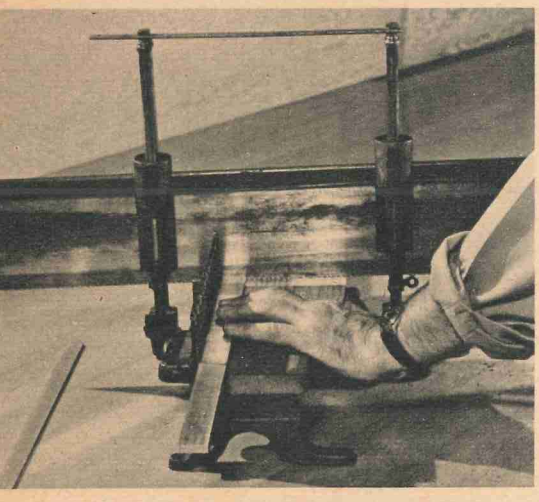
An ordinary auger bit and brace will work well, too, when the metal is backed with wood and clamped tightly.

Clean cuts can be made with a cold chisel; cut at an angle even with the top edge of vise jaw.

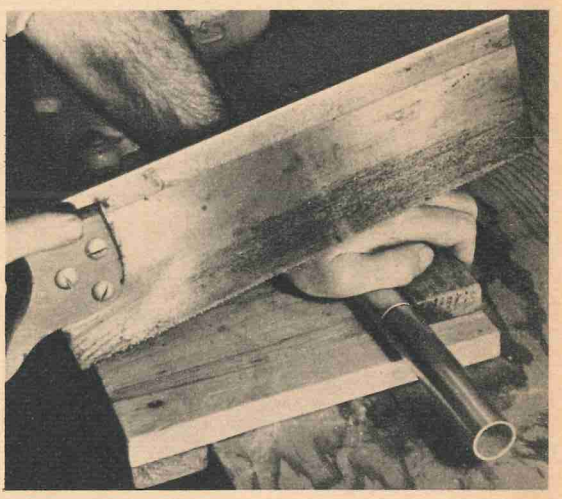


To protect aluminum surface, construct a simple V-block to hold tubing in a vise while cutting.





An adjustable mitre box will enable you to make perfect angle cuts on as many pieces as you wish.



Another common piece of workshop equipment which can be utilized in cutting is a bench hook.

USING YOUR CHISELS

Interior cuts, such as center holes in letters or numbers, can be drilled first and then cut clean with either a wood or cold chisel. The metal should be laid over scrap wood when a wood chisel is used. This saves the chisel edge and also prevents the metal from being bent out of shape.

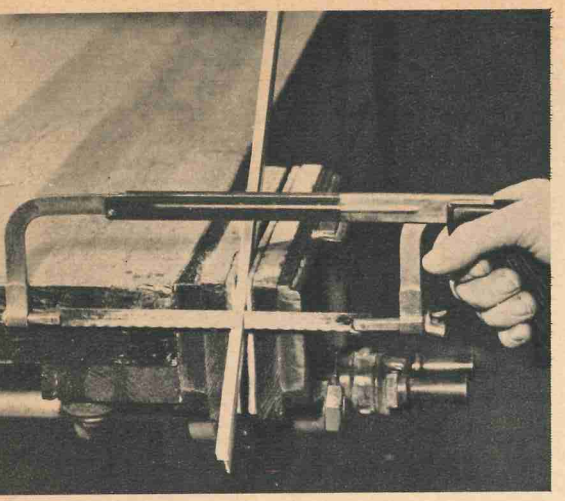
Clean cuts can be made with a cold chisel if a smooth-jawed vise or some angle iron is handy. Place the line on which you wish to cut even with the top edge of the vise jaw. Then raise your cold chisel to a sharp angle and make a shearing cut. Use a hard mallet or hammer to strike the chisel.

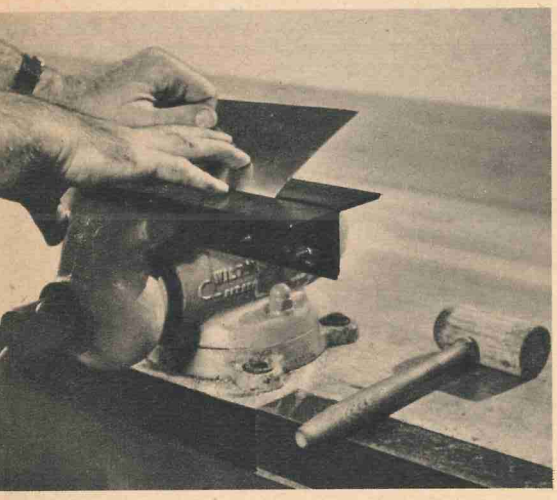
A strong paring or pocket knife can occasionally be used if the metal is placed over a block of wood and clamped down so that it will not slip or move.

PUNCHES

Both solid and hollow punches can be used for making relatively small holes. The solid punches work better when the metal is placed over either a lead block or the end grain of a wood block.

When sawing, place the metal in vise so that the line on which you saw is in a vertical position.





Place sheet aluminum between two angles set in a vise and mallet gently to form to desired shape.

FILES

One tip on filing sheets or other thin pieces of metal: make your file move nearly parallel, not directly across the metal. Also, keep a file card or brush handy because soft materials choke up the file teeth. Brush the file in the direction of the teeth, not across the teeth.

SAWING

Tubes and rods offer no special problems in sawing. When fastening them in a vise be sure to protect them from the sharp jaws of the vise. You can construct a couple of wooden V blocks to hold the round tubes or just cover the jaws of the vise with sheet aluminum.

A mitre box can easily be made which will give you a near perfect angle-cut on as many pieces as you wish. When cutting the second mitre of a tube it is important to see that it is cut with the tube held in the same position in the mitre box. If the tube revolves or turns, the second mitre will not be in the same plane as the first one. A pencil line drawn at each end of the tube before sawing will help solve this problem. A try square held against the first mitre will also enable you to check for correct position.

Do-It-Yourself bar stock and window-screen shapes can also be cut in a mitre box.

Another common piece of home workshop equipment which can be utilized in cutting bars and extruded shapes is the bench hook. This device is simple to make and has many uses.

One tip which you'll find particularly helpful in sawing angles and bars is to use what is called "the three-tooth rule." Try to hold your saw at an angle that will allow at least three saw teeth to be in contact with the metal at all times.

Finally, when hand-sawing angles, bars, and rods to an angle, place the metal in the vise so that the lines on which you saw are in a vertical position. This way you can saw straight down, which results in greater accuracy.

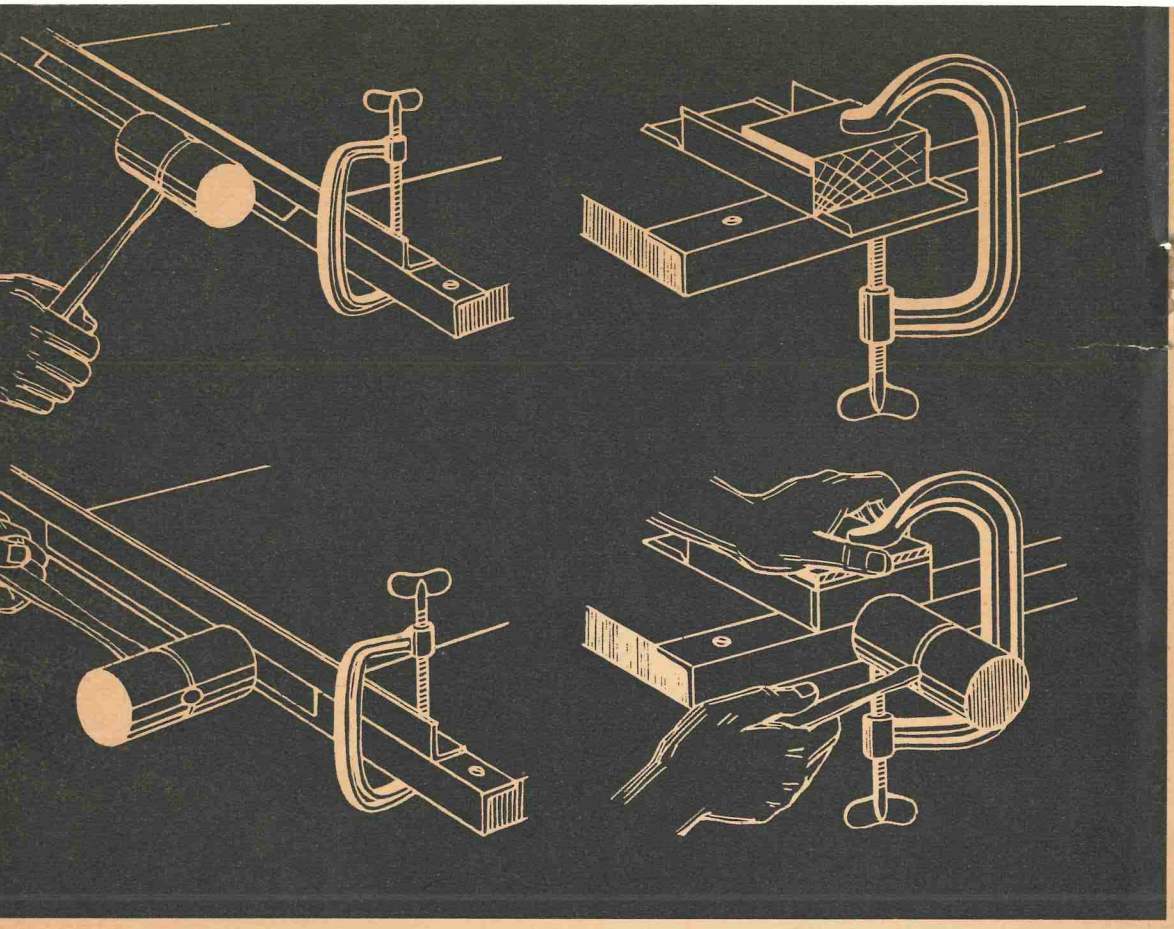
FORMING ALUMINUM

It's easy to form Do-It-Yourself Aluminum. No fancy metal shop equipment is needed. A few simple devices of your own making will suffice, in addition to your hand tools.

SHEET ALUMINUM:

For forming sheet aluminum, a mallet is essential. Outside of the very special ones you use for croquet or polo, almost any mallet that's smooth or soft will do. If you have an old, rough-faced mallet, perhaps you can file and sand it smooth enough for use. Just lay the sheet of metal over the edge of a smooth board and gently mallet it to the angle formed by the milled surface and edge. Or place the sheet between two boards in a vise and mallet away gently. Two boards clamped with either C-clamps or wooden screw clamps will serve in place of a vise.

A piece of aluminum angle (or angle iron) clamped to the smooth, sharp edge



of your bench will also hold the sheet metal for malleting.

A box can easily be formed around a block of wood clamped to the edge of your bench with a C-clamp. Remember to swing the clamp to one side before tightening.

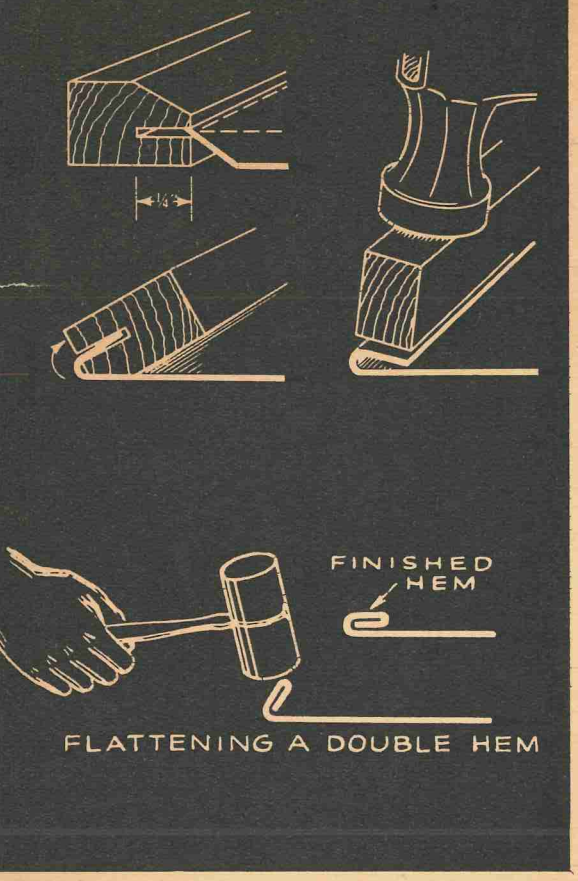
You can make your own bar folder, too. Saw a deep enough kerf in the edge of a board and plane a bevel on one edge. This will expedite the forming of hemmed edges and various seams.

Another simple idea for forming sheets is to force one part over the edge of a board with still another board held in the hand.

You can also wrap the sheet metal around a dowel with your hands after starting the edge of it over with a mallet. If necessary force the sheet around after anchoring it in a shallow kerf in the dowel rod. A piece of water pipe or sewer pipe can also be used to curl the metal. In fact any cylindrical object, from a can of beans to a broom handle, can be used.

If you want to form a round, shallow ash tray, or a set of coasters, just clamp a piece of 2x4 in your vise, end grain up,

Sheet aluminum can also be formed around a dowel after anchoring it in a shallow kerf in the wood.



FLATTENING A DOUBLE HEM

and with a light ball peen hammer, gently use the ball end in a circular direction starting at the outside edge of the metal disc. Strike the aluminum with light, uniform blows. Hold the disc at the same angle until you have hammered completely around the disc. These hammer blows actually stretch the aluminum, so try to stretch the disc equally all the way around. A wrinkle appearing at the hammered edge is evidence that you need to hammer again gently at this point, because the metal is stretched unevenly. Hammering, of course, has the same effect on aluminum that cold-working has on any metal. It becomes harder, more brittle, and, if hammered too much, will break or crack. A little practice will show you how much hammering these aluminum sheets will take.

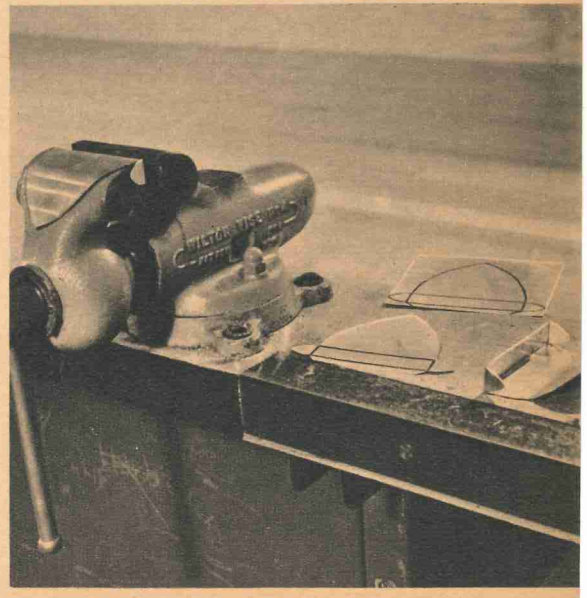
RODS-BARS-TUBES:

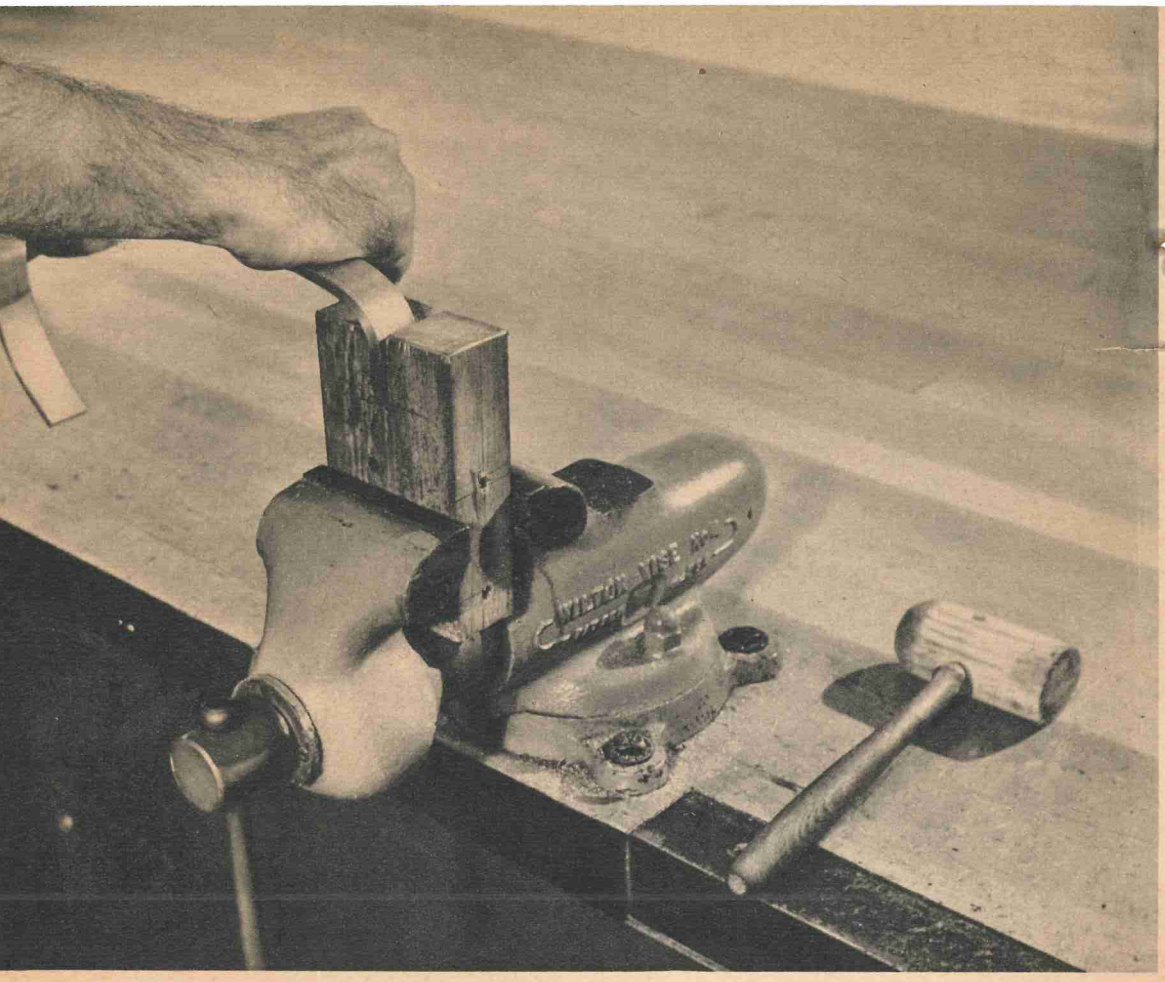
Forming solid rods and bars is a snap. Do you want a 45° or 90° angle? If you are using a metal-working vise, first cover the jaws with scrap aluminum, then place the rod or bar in between and parallel to the vise jaws. If the stock is a foot or so in length, push the protruding end in the direction you want it to go with one hand while striking near the vise with a mallet or ball peen hammer. Any angle up to 90° can be formed in this way.

A good bending jig for rods is a block

To form round, shallow pieces, hold metal against the end grain of a wood block and peen lightly.

When using a metal-working vise, cover jaws with scrap aluminum to prevent marring new material.





A notch sawed into a block of wood (held in a vise) makes an effective jig in which to bend bar stock.

of wood with a hole drilled through it slightly larger than the rod itself. The jig can be held securely in a vise.

A notch sawed into a block of wood (held in a vise) makes an effective jig in which to bend bar stock. You'll have to use a mallet, though, to get a sharp bend.

A round, wooden jig anchored securely by two large screws and notched to hold the end of a bar can be made and used when arcs and complete circles are to be formed. The sharply bent end can be sawed off after the circle or curve is formed.

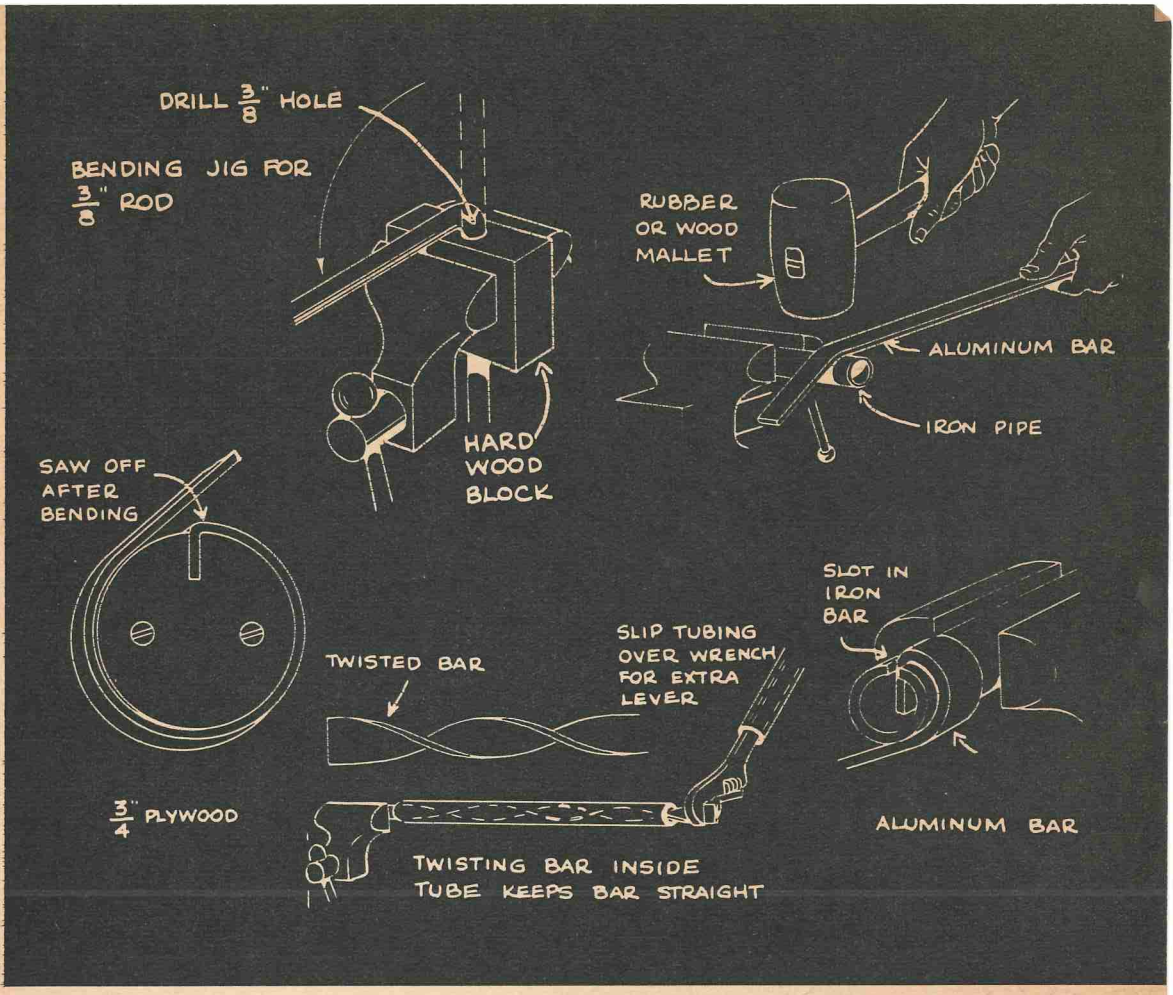
Slight curves can be fashioned with a mallet over a piece of iron pipe held in a vise. Be careful, however, not to mar the aluminum with a hard mallet or hammer when using this method.

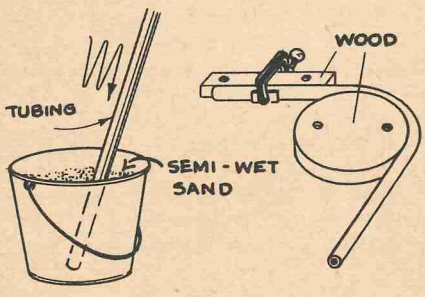
An interesting twist can be given to bar stock quite easily. Place one end of the bar in your vise. Set a length of pipe over the bar to hold it straight while forming the twist. Then merely twist the bar with a wrench fastened to the free end.

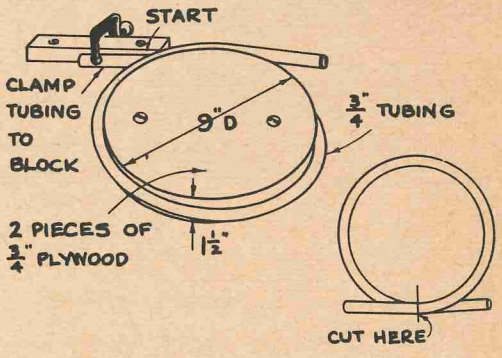
Sometimes you'll want to bend a bar in such a way that a sharp angle is formed on the inside of the bend. You can do this simply by sawing a small slot in the bar where it is to be bent. This will enable you to fasten the bar around an exactly square corner.

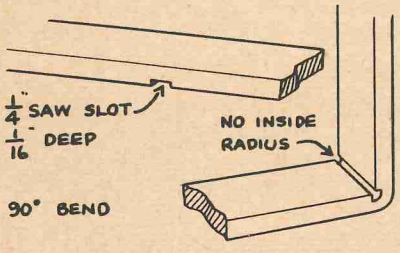
Building a jig (for forming tubes, rods and bars in curves) is not as difficult as dancing one. In fact, the expression "in jig time" could apply to the time it takes to make one. Just saw a board or piece of plywood to the curve pattern you want on your jig saw, or with a coping saw. Nail, clamp, or screw this pattern to a rigid surface, such as your workbench. Fasten a small block of wood at a distance from the curved piece equal to the thickness of the stock to be formed and located at the beginning of the curve.

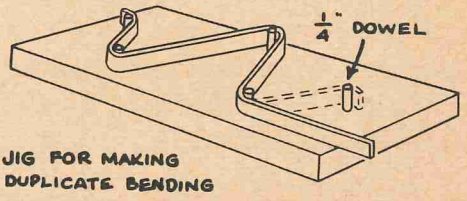
When forming sharp curves, insert a wooden stopper in one end of the aluminum tubing, then wet down a bucket of sand and push the tube into the bucket until it is

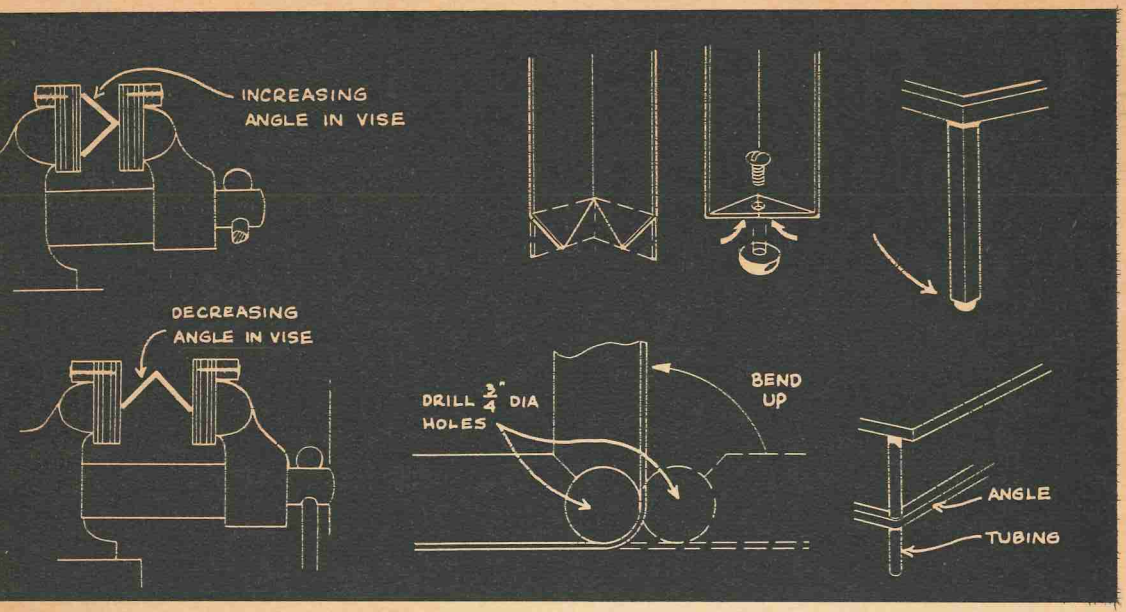

DRILL 3/8" HOLE
BENDING JIG FOR 3/8" ROD
HARD WOOD BLOCK
RUBBER OR WOOD MALLET
ALUMINUM BAR
IRON PIPE
SAW OFF AFTER BENDING
3/4" PLYWOOD
TWISTED BAR
SLIP TUBING OVER WRENCH FOR EXTRA LEVER
TWISTING BAR INSIDE TUBE KEEPS BAR STRAIGHT
SLOT IN IRON BAR
ALUMINUM BAR


TUBING
WOOD
SEMI-WET SAND


START
CLAMP TUBING TO BLOCK
9" D
3/4" TUBING
2 PIECES OF 3/4" PLYWOOD
1 1/2"
CUT HERE


1/4" SAW SLOT
1/16" DEEP
NO INSIDE RADIUS
90° BEND


1/4" DOWEL
JIG FOR MAKING DUPLICATE BENDING



filled. Plug the open end. Proceed to form in your jig. Slowness is a real virtue here. Form "a wee bit" at a time.

The reason is that in bending a tube, the metal on the outside of the bend is being stretched and the metal on the inside is being compressed. Buckling on the inside, rupturing on the outside, and flattening, frequently result from bending too fast. Good results, however, are easy to achieve with Do-It-Yourself Aluminum tubes.

The following table gives you the smallest radius to which it is practical to bend the various diameter tubes when filled with sand.

TUBE DIAMETER	SMALLEST SUGGESTED RADIUS
¾"	2½"
1"	4¾"
1¾"	5½"

When you are bending without using sand in the tube double the suggested radius.

Still another method of forming tubes and rods is to place two smooth pegs (large dowel rods) in a thick board, or two metal pegs in a steel plate, and, with this assembly held in a vise, make the bend by pulling slowly and steadily on the free end of the stock.

ANGLES:

Angle stock can be formed easily in a vise. Use a mallet at or near the vise while pulling the angle with your other hand in the desired direction.

When forming an angle around a tube or rod, first drill a hole in the angle, insert the rod or tube, and then bend the angle the proper number of degrees.

Your aluminum angle may be easily decreased or increased from the normal 90° in a vise, as shown in the drawing.

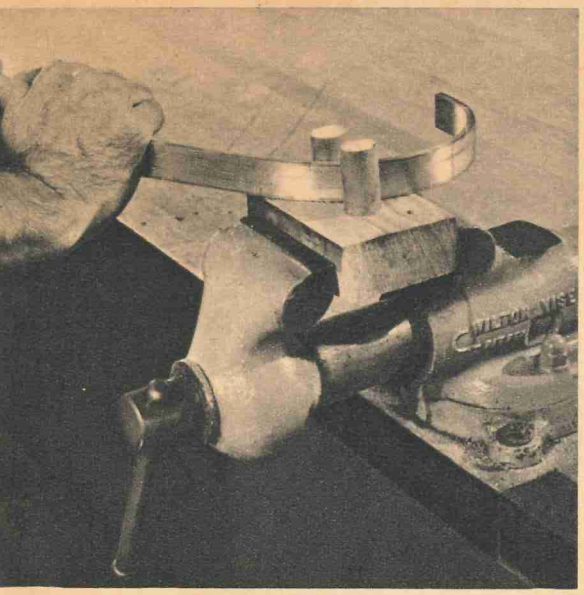
A foot can be formed on an angle which is being used as a table leg by sawing a 90° point on each side. After sawing, bend the two points together, drill a hole for a machine screw and fasten a rubber tip under the foot.

JOINING

Making joints (and we do not, of course, mean visiting the local tavern) requires no great skill when using this new aluminum.

First, the sheets. A grooved seam is one common method of fastening two sheets or the two ends of one sheet together. Just fold both edges an equal amount and mallet them together. Make a couple of dents in the seam with a centerpunch or nail. This will prevent some loosening of the

Another effective jig can be made by spacing pegs in a block and bending aluminum around them.



joint. You can offset the seam, which will improve its appearance as well as its strength, with a homemade wooden groover.

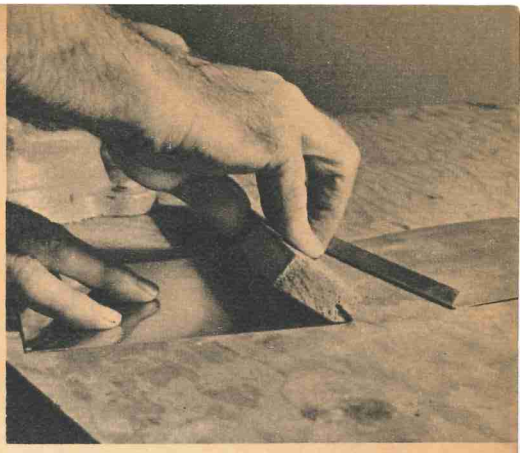
To make an allowance for a grooved seam, add three times the width of the seam to your overall measurements. One half of that, of course, is added to each side, or to each piece, if two pieces are being joined together.

In some situations two sheets can be tied together tightly with a clip which is driven on with a mallet. The clip can be made rigid by riveting or by simply dimpling with a sharp tool such as a nail or centerpick.

Tabs and slots can be used also as a method of fastening sheets together. Many sturdy, and good-looking, toys are fastened together in this manner. Use your ¼-in. wood chisel to cut the tabs and slots. Aim at a tight fit.

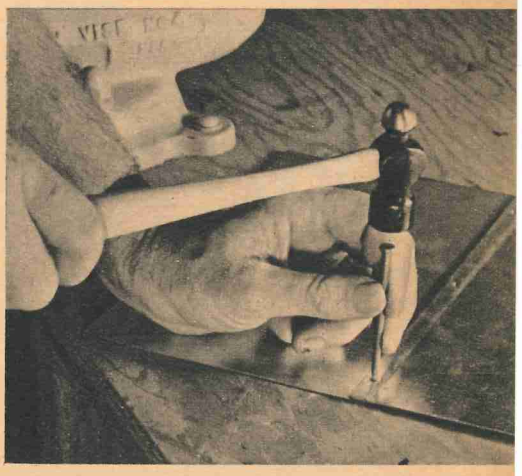
Rivets are used just as they are on other metals. To avoid rusting you should stick to aluminum, chromeplated, or tinned iron rivets.

Use any piece of steel that's handy to back up the rivet. For flat pieces, even a hammer head held in your vise will do. On circular pieces such as buckets, pipe, etc., use a piece of steel pipe in your vise.

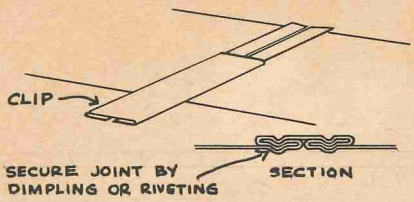


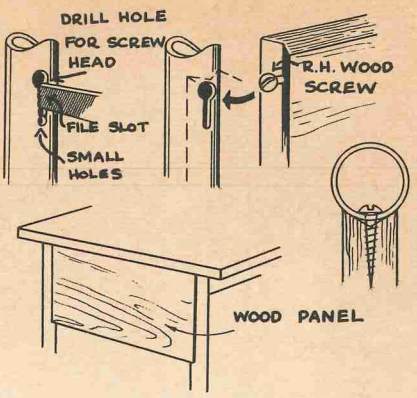
To join two sheets of aluminum, first fold over corresponding edges an equal amount.

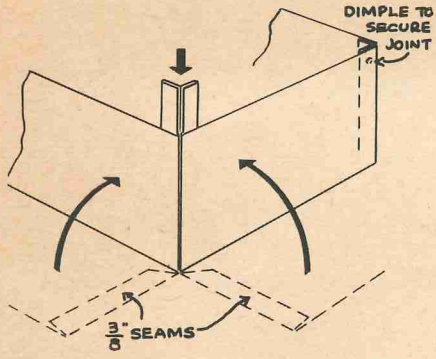
With edges folded, hook lips, then mallet together, using a block to protect metal.

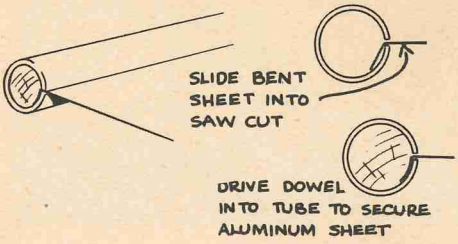


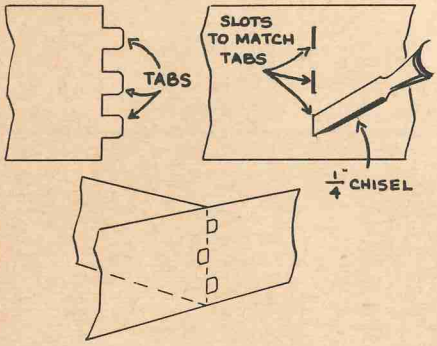
Prevent loosening of the joint by adding dimples in the seam with a center punch.

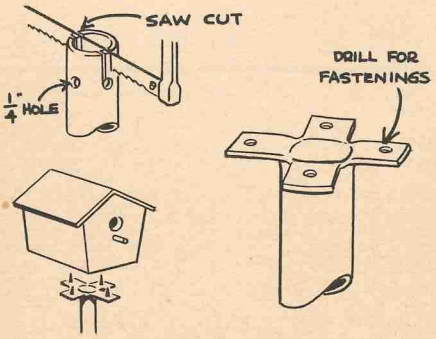

CLIP
SECURE JOINT BY DIMPLING OR RIVETING
SECTION

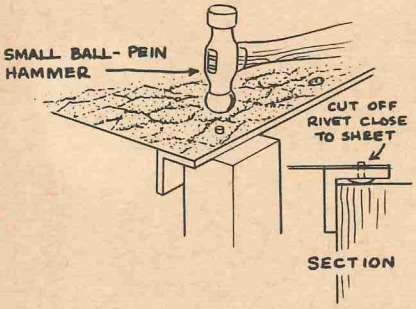

DRILL HOLE FOR SCREW HEAD
R.H. WOOD SCREW
FILE SLOT
SMALL HOLES
WOOD PANEL

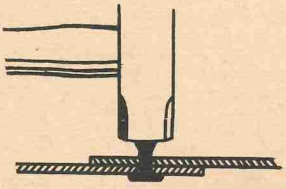

DIMPLE TO SECURE JOINT
3/8" SEAMS

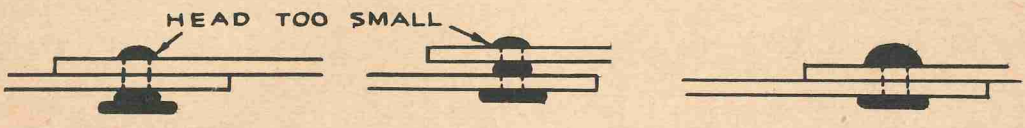

SLIDE BENT SHEET INTO SAW CUT
DRIVE DOWEL INTO TUBE TO SECURE ALUMINUM SHEET


TABS
SLOTS TO MATCH TABS
1/4" CHISEL


SAW CUT
1/4" HOLE
DRILL FOR FASTENINGS


SMALL BALL-PEIN HAMMER
CUT OFF RIVET CLOSE TO SHEET
SECTION


UPSETTING RIVET


HEAD TOO SMALL
IMPROPERLY RIVETED
PROPERLY RIVETED

When choosing the correct size twist drill to make holes for rivets, a quick method is to match the shank of the drill to the body of the rivet. Beware of using a drill too large as this would make a tight rivet joint difficult or impossible. A hole which is too small can always be enlarged.

How long should your rivets be? Allow them to protrude or stick up at least one and a half times the thickness of the rivet.

Be sure the two sheets are drawn together after the rivet is inserted. Do this by tapping lightly with your hammer or a block of wood on each side of the rivet.

Next, with the ball end of your ball peen hammer, peen or mushroom the end of the rivet.

Finally, sandpaper or emery cloth the mushroom smooth.

When fastening aluminum sheets to wood, use round-headed wood screws or self-tapping metal screws. Drill a pilot hole for both of these so that the wood doesn't split and maximum strength is attained. The diameter of the pilot hole is always the size of the core of the screw.

Sometimes, when making a desk or table, you need to hide the fastening device. Drill and file a small slot in the tube the size of the screw shank. Then drill a larger connecting hole at the top for the screw head. Fasten the screw in the wood deep enough so that pressure has to be applied when forcing the screw into the bottom of the small slot.

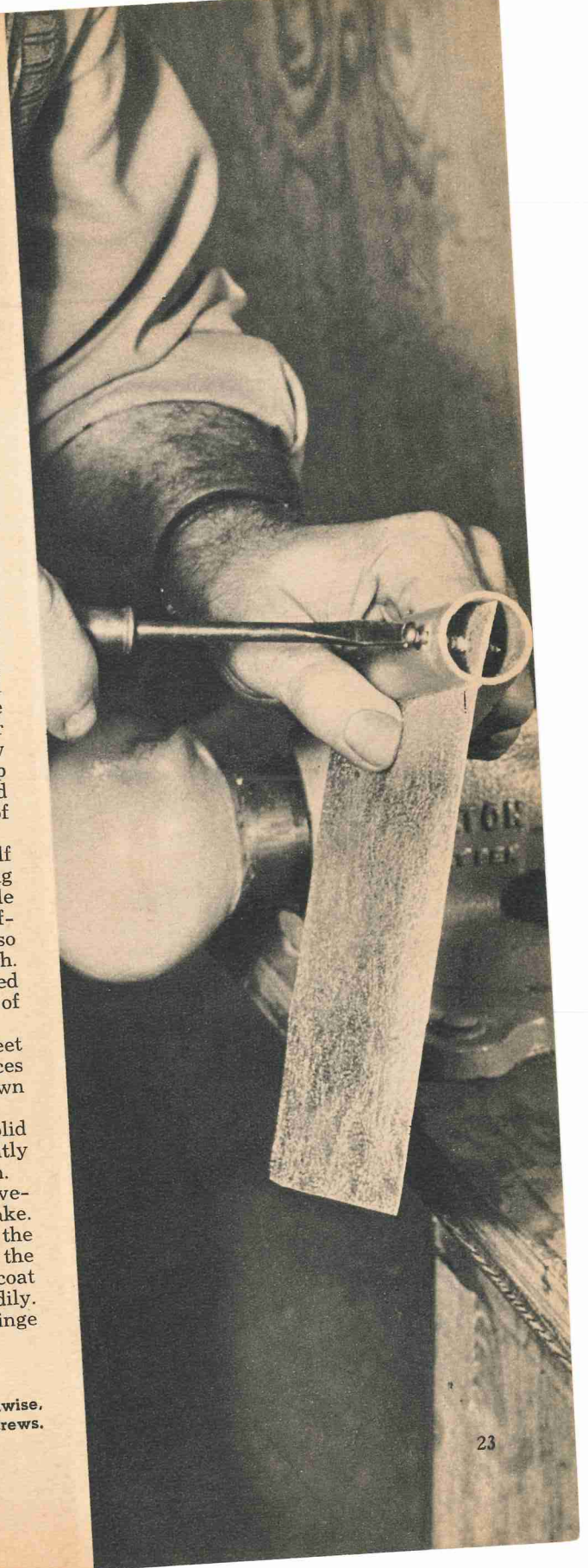
The problem of fastening Do-It-Yourself sheets to tubes is often solved by slitting the tube lengthwise, drilling a pilot hole in both tube and sheet and inserting self-tapping screws. Machine screws can also be used if the hole is drilled large enough.

The end of a sheet may also be anchored in the tube by driving a short piece of dowel rod into the tube at each end.

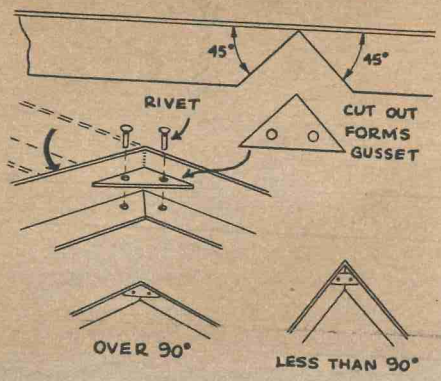
Another good method of fastening a sheet to a tube is to saw the tube in four places so as to form flaps which can be bent down and drilled for screws.

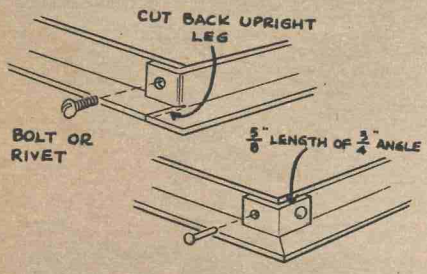
A sheet can also be connected to a solid rod by simply wrapping the sheet tightly around the rod more than one full turn.

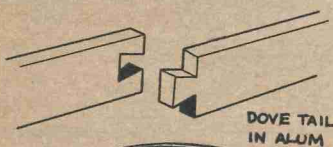
A hinge joint is often used when movement is necessary. It is not difficult to make. Lay out the hinge allowing 3⅓ times the diameter of the wire on each side of the hinge. Use a piece of stiff wire, such as coat hanger wire, which does not bend readily. There should be an odd number of hinge

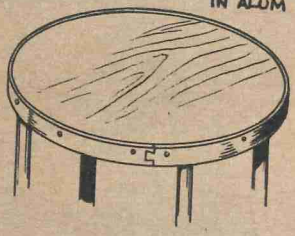


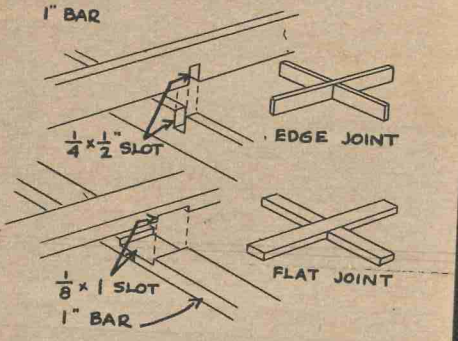
Fasten sheet to tube by slitting tube lengthwise, inserting sheet; secure with self-tapping screws.

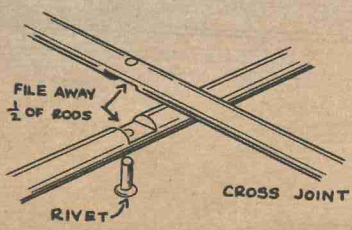

45°
45°
RIVET
CUT OUT FORMS GUSSET
OVER 90°
LESS THAN 90°

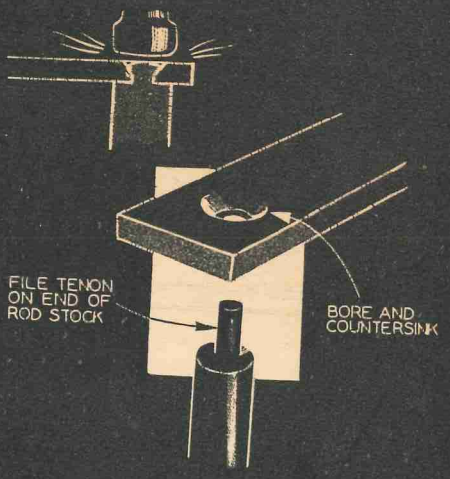

CUT BACK UPRIGHT LEG
BOLT OR RIVET
5/8" LENGTH OF 3/4" ANGLE

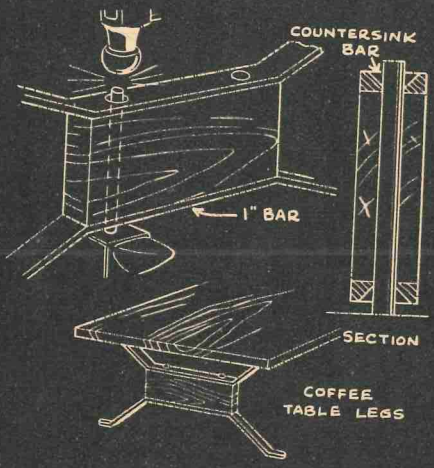

DOVE TAIL JOINT IN ALUM BAR

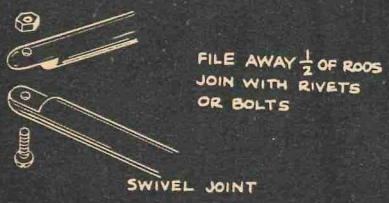


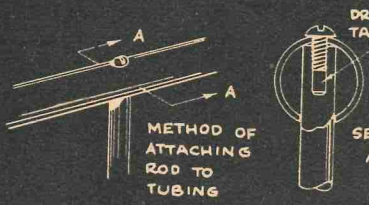

1" BAR
1/4 x 1/2" SLOT
EDGE JOINT
1/8 x 1 SLOT
1" BAR
FLAT JOINT

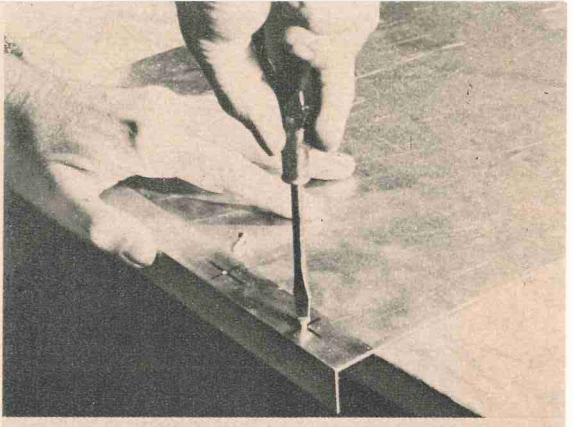

FILE AWAY 1/2 OF RODS
RIVET
CROSS JOINT


FILE TENON ON END OF ROD STOCK
BORE AND COUNTERSINK


COUNTERSINK BAR
1" BAR
SECTION
COFFEE TABLE LEGS


FILE AWAY 1/2 OF RODS JOIN WITH RIVETS OR BOLTS
SWIVEL JOINT


A
A
METHOD OF ATTACHING ROD TO TUBING
DRILL AND TAP 10-24
SECTION A-A



Aluminum angle can be fastened to a metal sheet easily with self-tapping or sheet-metal screws.

sections (3-5-7-9) so that the stress and strain is equalized along the entire length of the wire. Form the hinge section around the wire by bending the metal tabs as you would a hemmed edge. Then insert the wire and complete forming the metal around the wire with a mallet and pliers.

In the riveting of angles and bars, cleats and corner gussets are often used. Both add considerable strength to a joint if they are riveted tightly.

Two ends of a bar can be joined strongly and without the joint being noticeable if a good dovetail is cut into the ends with a saw and filed accurately.

The cross-lap joint, common in woodwork, can also be used on the aluminum bars and rods. Draw carefully with a scratch awl or scribe before sawing joints. Saw inside the lines and then file to the final fit.

Occasionally you'll need to rivet a rod to a bar. This requires that a shoulder be sawed or filed on the rod so that the end forms a rivet of the correct length. Drill a hole in the bar big enough for the reduced end of the rod. You can countersink the hole in the bar enough to hold the mushroomed end of the rivet.

Two pieces of rod can be joined together very strongly with a stud bolt. Drill your holes for tapping after centerpunching accurately.

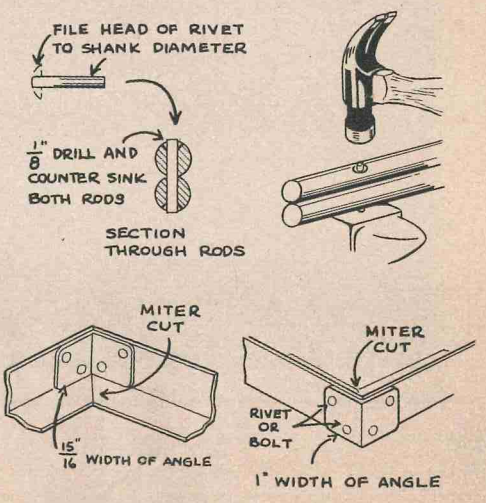
A swivel joint on rods is not difficult to make. Simply saw and file away ½ of each rod end. Then drill and join with either rivets or bolts.

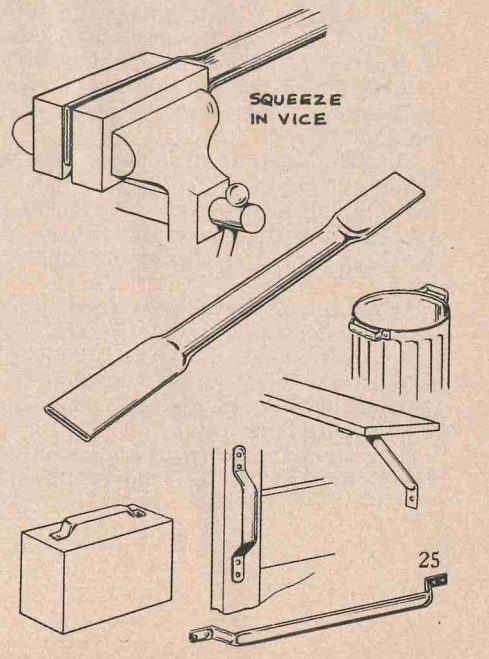
When fastening two rods or bars together the head of the rivet can be filed away and the metal countersunk on both sides. This permits an invisible, riveted joint.

An angle can be joined to an angle in many ways, too. Here is one method used successfully where strength and appearance are both important. Carefully measure, saw and bend one of the angles as shown here. Then, measure, drill, and rivet the two pieces together. Two rivets, one on each side of the angle, are necessary.

You'll want to join an angle to a piece of wood frequently. One method which produces a very strong joint is to saw a deep kerf in the wood, insert the angle, and drill a pilot hole for a wood screw.

An angle can also be fastened to a sheet of metal easily with self-tapping or sheet-





Two lengths of tubing can be joined by use of a dowel; screw tubing to dowel for additional security.

metal screws. Be sure the hole is no larger than the core of the screw.

A tube can easily be joined to wood with wood screws and in many cases with machine screws. To strengthen the tube so that the tightening pressure will not flatten it, insert a short wood plug before drilling.

A tube can also be flattened at one or both ends and screwed or riveted to angles, bars, or sheets.

Another very useful joint is formed by driving a tight plug part way into one tube and then fitting another tube over the protruding end. Additional security is gained by using screws to anchor the tube to the plug.

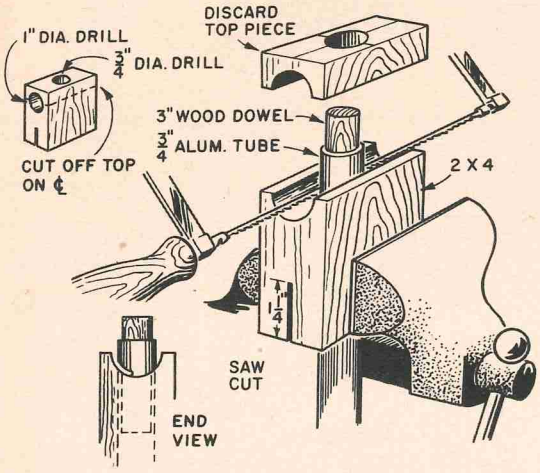
Wood screws can also be used to fasten a tube to one end of another tube if a dowel rod is first driven into one of them. The end of one tube can be shaped to fit the outside of the other with a coping saw and a half-round file.

Still another widely used method of fastening tube to tube is to slit (with a hacksaw) a short section of tube and drive it part way into one tube. Then, after driving the other tube in place, anchor them both with self-tapping or sheet-metal screws.

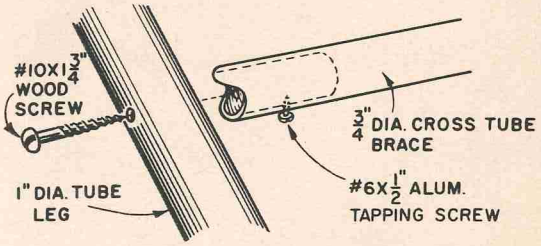
A strong and useful joint between a tube and a bar can be made without too much trouble. Saw a slit in a short length of dowel rod and a V cut at the slit end. Drill a hole for a long bolt or machine screw in both the dowel and the bar. As the bolt is tightened it will have a tendency to force the split end of the dowel tightly against the sides of the tube.

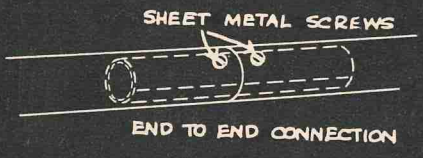
Still another method of joining a bar to a tube is to drill and file a small slot in the tube. Then notch the tube so that it fits into the slot tightly. A machine screw can also be run through both and will add rigidity.

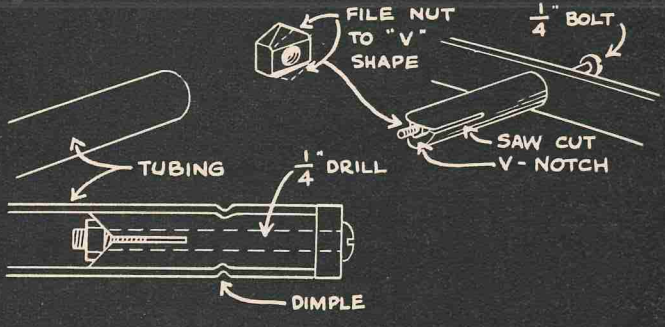
Frequently you'll want to fasten a tube to an angle. This can be done quickly by pinching the end of the tube flat in a vise, and drilling it for rivets. Sometimes the angle will have to be sawed before riveting.

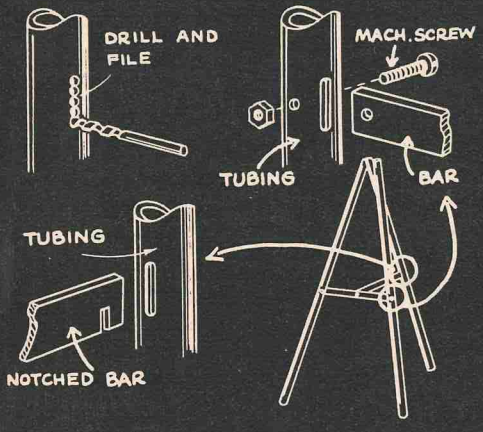


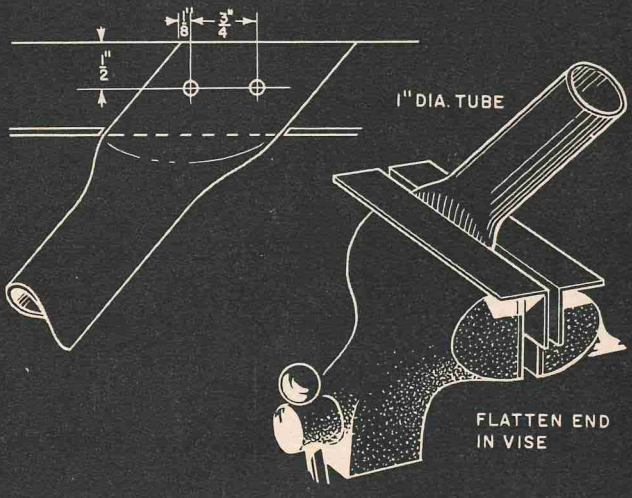
JIG FOR CUTTING CURVE IN 3/4" DIA. TUBE TO FIT 1" DIA. TUBE

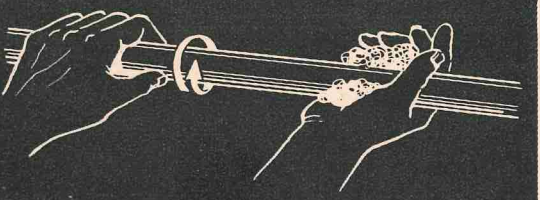


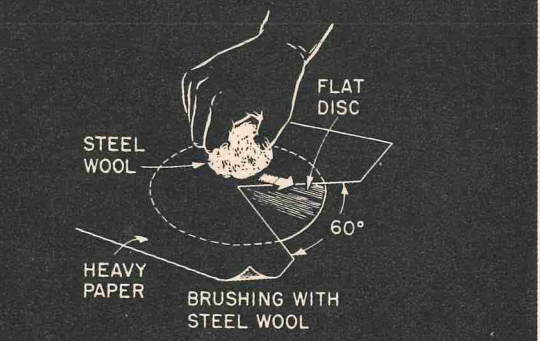


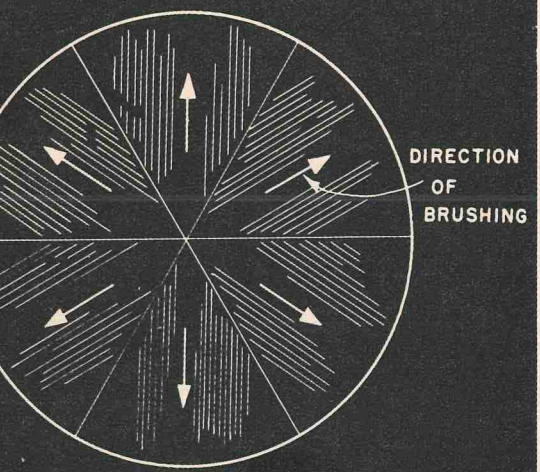




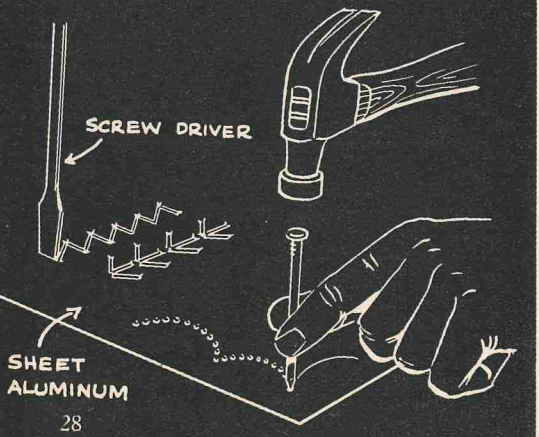








SCALLOPED COASTER PATTERN



FINISHING

One of the important virtues of this new aluminum is its beautiful appearance when purchased. It's a smooth, bright, modern-looking material. Actually, on no job will you find it necessary to wear your arms down to the elbows applying a fancy finish. On most jobs, if you are normally careful, a few minutes' work will do the trick. Special finishes, special effects are, of course, possible. The information presented here may give you some new ideas, too.

Some quick experimentation will show you which of the hand finishes are the best ones for a particular job.

If you are familiar with the use of steel wool on wood you know that the various grades of the material are excellent for removing small scratches and, when rubbed lightly in one direction, fashioning a smooth, uniform finish.

Good old sandpaper, in its finer forms, will produce satisfactory results also. Deep scratches may make it desirable for you to use some emery cloth on occasion. Of course, the sawed ends of tubes, bars, and window screen pieces should be filed before using abrasives. This will save some "elbow grease."

Another abrasive, widely used and very effective, is pumice stone. The finer grades of this, mixed with oil or water, will produce a smooth, scratch-free finish. You can rub the mixture on the metal with your hand or a rag.

All of these abrasives can be purchased at the local hardware store. They are graded according to the roughness of the abrasive.

Still another abrasive which can be used effectively on small pieces is tooth paste or powder. An old toothbrush, or any similar brush for that matter, will serve as an applicator.

Uniform hammering with a light ball peen hammer—a process called planishing—will produce an interesting finish, particularly on bars, rods, and plain sheets. Apply a little steel wool afterward to secure a two-tone effect. Remember to planish the sheets over a hard surface: either steel or very hard wood.

Interesting effects can be secured, particularly on sheets and bars, with various sized nails and a hammer. File the points of several nails to various shapes. Then, after placing the metal over a semi-hard surface such as a piece of hardwood, tap a uniform pattern of nail marks into a specific design.

Have you ever wanted to produce the attractive silvery effect of what is known

commercially as the frosted finish? You can. That "fine-etched glass" look is easy to secure on small objects. Just add a few tablespoons of lye to some lukewarm water and submerge the aluminum until it has been etched or frosted adequately. Then, immediately after removing, dip for a few minutes in cold water. Wipe the object completely dry with a clean soft rag after taking it out of the cold water.

This frosted finish, however, will fingerprint easily, unless you put on a protective coating of lacquer or varnish. Be sure the metal is absolutely dry before lacquering.

Interesting antique effects can be produced on the embossed aluminum sheets with very little effort. Paint the sheet any color you wish; then, after the paint has dried, rub off the top or exposed paint with steel wool. This leaves some paint in the bottom of the wrinkles. The process adds color and character to the metal.

Another of the many virtues of Do-It-Yourself Aluminum is the fact that it can be easily painted, enameled, or lacquered. You can clean the metal before painting with steel wool, sandpaper, thinner, mineral spirits, or plain vinegar rinsed off with water. Try to keep your fingers off the surface to be painted so that the natural oils in your skin will not spoil the bond.

POWER TOOLS

You can get your portable drill out, wipe off your saw table, and oil that buffing head again. Do-It-Yourself Aluminum will give you plenty of opportunity to use all your power tools. If you feel that you haven't gotten your money's worth out of them so far, you'll change your mind after trying them on this new metal.

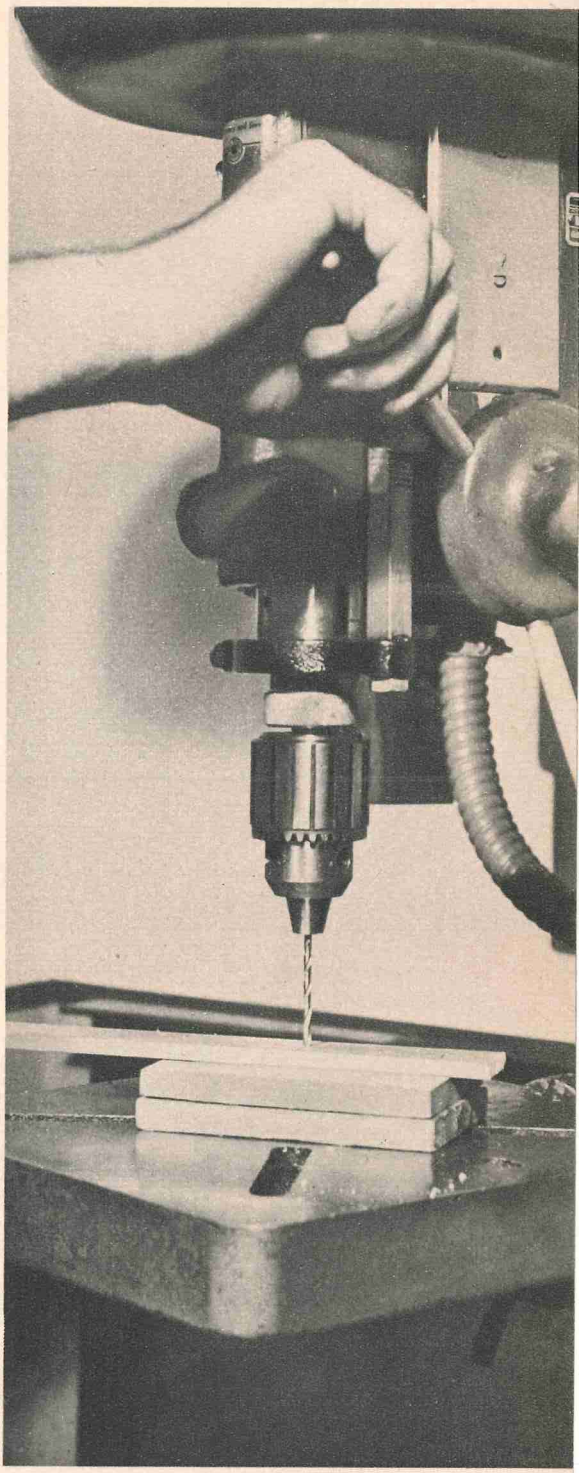
Use the same general procedure you'd use on hard woods. No special adjustments or accessories are necessary. High speeds, slow feeds, and sharp tools—these are the general rules. Sometimes a little oil or other lubricant will help, but this is not absolutely necessary.

DRILL PRESS:

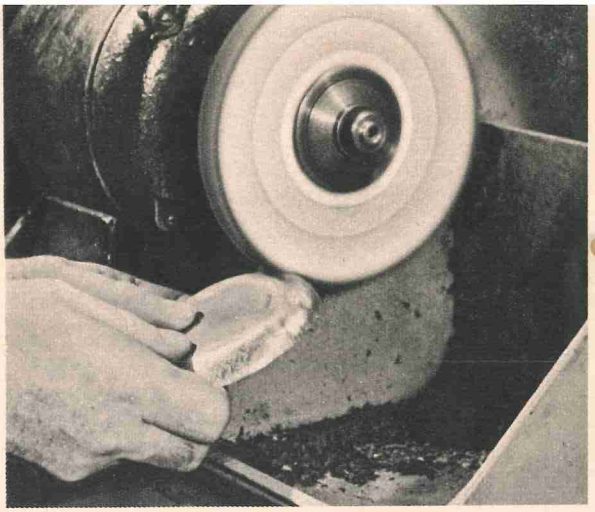
Your drill press will be useful in many ways. Holes can be drilled with twist drills, wood bits, or circle cutters. Ordinary auger bits can be used if the lead screw is ground to a point and the tine cut off.

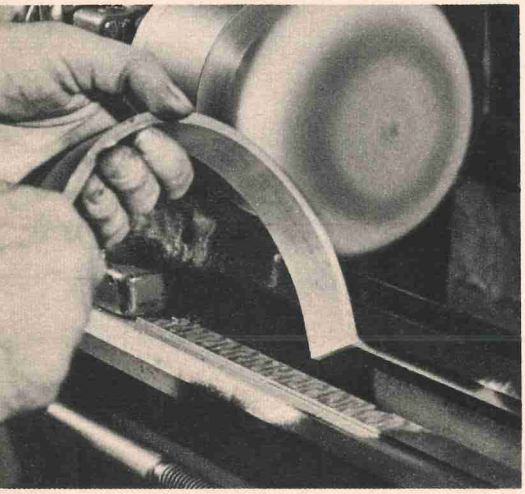
The power wood bits cut effectively when a pilot hole is drilled first to receive the tip of the bit.

It's a good idea to carefully centerpunch all holes before drilling. Then, clamp your work to the drill press tool with a scrap of wood underneath.



Drill aluminum just as you would hard woods; no special adjustments or accessories are necessary.



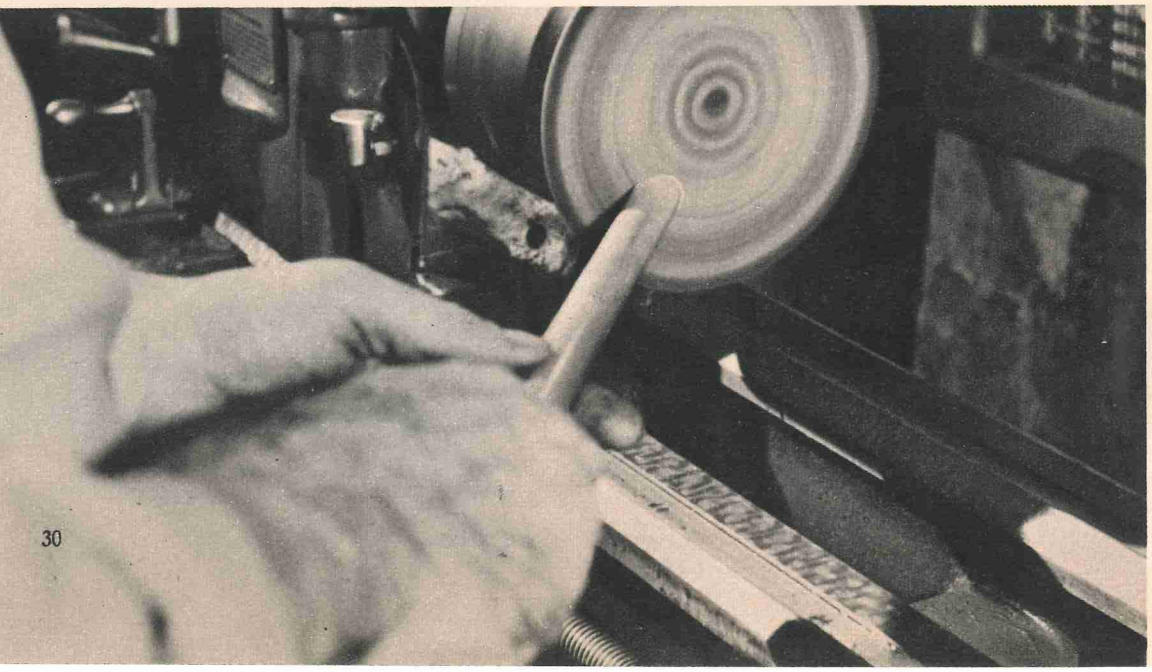


Buffing can be done on your drill press as well as with a buffing head or portable power drill.

Use tripoli powder to put a lustre on your metal; the finer the abrasive the brighter the finish.

Hold the work lightly against the buffing wheel to remove pits and clouds which sometimes form.

Cement sandpaper or emery cloth to a rotary disc and use to shape the ends of bars, tubes, and rods.



A damascene finish, or sunswirl as it is sometimes called, is no trouble to apply with a drill press. Cement a soft piece of rubber to the end of a ½-in. dowel rod and a piece of emery cloth to the rubber.

With the dowel rod in the chuck, run the drill press slowly while moving the handle up and down. If you want a straight, formal pattern, slide the work along a guide hand clamped to the table.

A set of round, straight-shanked files designed for use on your drill press will prove useful for enlarging and cleaning irregular-shaped holes or curves. Use them just as you would on wood, except when using sheets; these should be fastened over a piece of wood to provide rigidity.

BUFFING:

You'll discover that buffing, which brings out a high luster on metal, can be done on your drill press as well as with a buffing head or portable power drill.

Straight-shanked holders for cloth buffing wheels are relatively inexpensive, or can be made without too much trouble. Run your drill press or buffing head at high speed when buffing. This helps to hold the edge of the wheel close to the metal.

Tripoli powder, which is a soft, spongy silica mixed with a grease binder and molded into cake form, is probably the most common buffing agent used. You can buy this in various degrees of fineness. The finer the abrasive the brighter the finish.

Hold the work lightly against the wheel for a high lustre and also to remove dark pits and clouds which sometimes form on the metal. Occasionally, when the buffing wheel gets too hard, a new, soft wheel will have to be used to eliminate streaking and clouding.

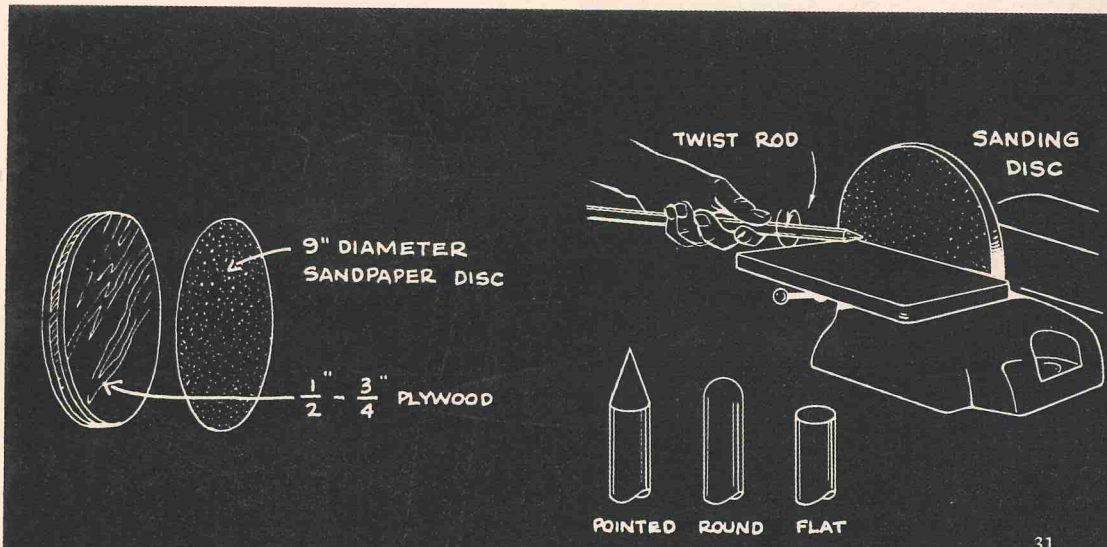
Wire wheels attached to your buffing head or to the drill press can be used to secure what is known as scratchbrush and satin finishes.

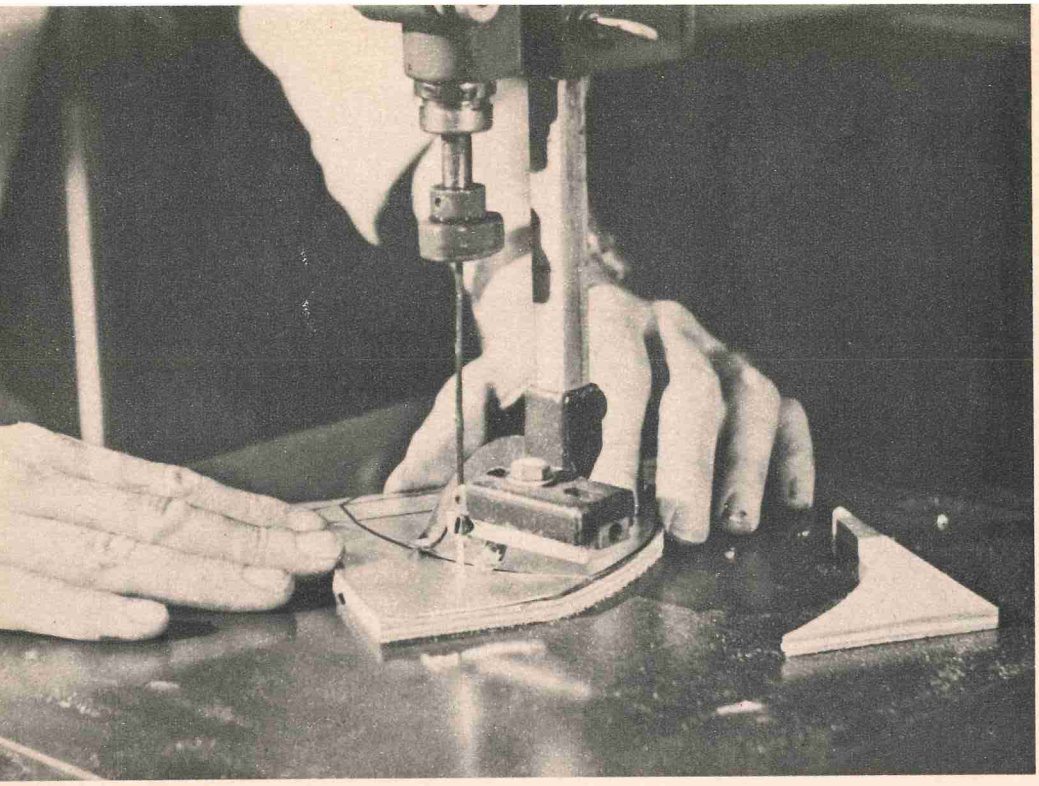
The scratchbrush finish is obtained by holding your work against a coarse wire wheel. Be sure to remove all dirt and grease from your aluminum first. These wheels are made of various metals. Stainless steel wire is very common, but others are available made of brass or German silver (nickel steel).

The satin finish is obtained by using a finer wire-brush wheel. The finer the wire, the finer the texture of the finish. A six-inch diameter wheel traveling at 450 to 600 rpm will give a good satin finish.

If you don't have a metal disc for your buffing head to which you can cement sandpaper or emery cloth, you can make a serviceable disc out of plywood. A nine-inch disc, sawed on your jig or band saw, of ½-in. plywood will do the job. Just cement your abrasives to the disc.

These abrasive wheels or discs have a variety of uses. They can be used to shape the ends of rods, bars and tubes, to smooth sawed or filed surfaces, and for finishing effects on small objects.





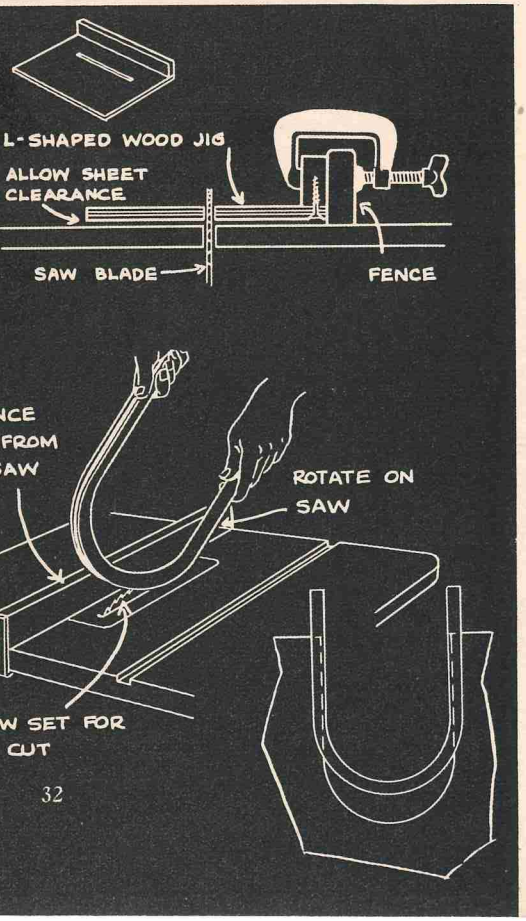


TABLE SAW:

Your table saw will earn its keep again and again if used on this new aluminum. Slip on your combination blade, if you have one, for this work. Carbide-tipped blades, as well as your rip and cross cuts will serve nearly as well.

Here are two suggestions which have proven helpful when cutting sheets. Clamp an L-shaped wooden jig to the rip fence to prevent the metal from jumping up or chattering as the metal is fed slowly into the blade. After starting the saw, raise the blade high enough to cut into the wood before feeding the metal. Paraffin or wax on the saw table will also cut down any drag and chattering.

You may want to saw one side of a tube lengthwise so that it can be used to cover the edge of a sheet. You can even do this after forming a tube to a simple C-curve. Just adjust the rip fence the correct distance from the blade's centerline and rotate the tube against the fence as you feed it into the blade. Use a push stick if necessary on short, straight pieces.

Angles can be sawed lengthwise readily by using the rip fence. The sawed edge that results can be filed smooth, or planed, or jointed. Again, a little paraffin on the table

and the fence will reduce and sometimes eliminate chatter and drag.

Occasionally you'll need to reduce the end of a rod for joining to a bar or another rod. This can be done almost as quickly as you can say Marilyn Monroe, by using the mitre gauge as a cut-off guide on your table saw. Remember to set your mitre gauge at exactly 90° so that the shoulder is square (if that is what you want).

JOINTER:

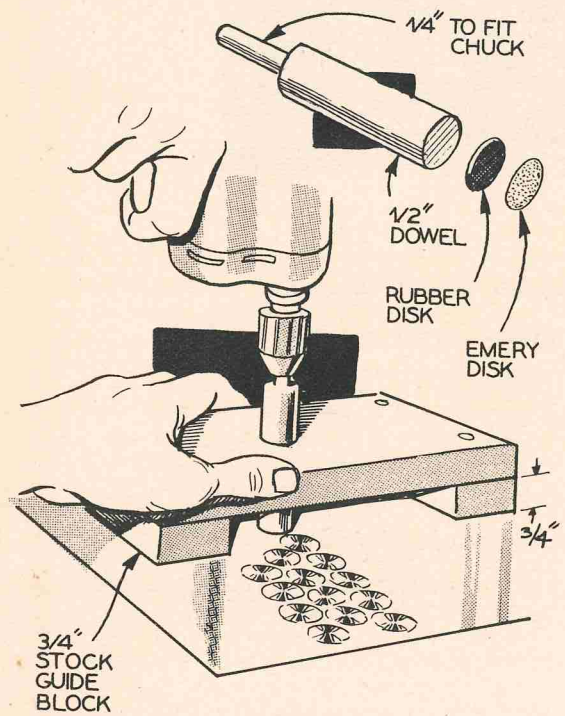
Your jointer can be very useful, particularly on longer pieces of bar and angle stock. The same safety rules apply as in wood work. Avoid trying to joint short pieces (less than five times the length of the cutter head opening in the table) and do not set blades to remove less than one-eighth inch of stock.

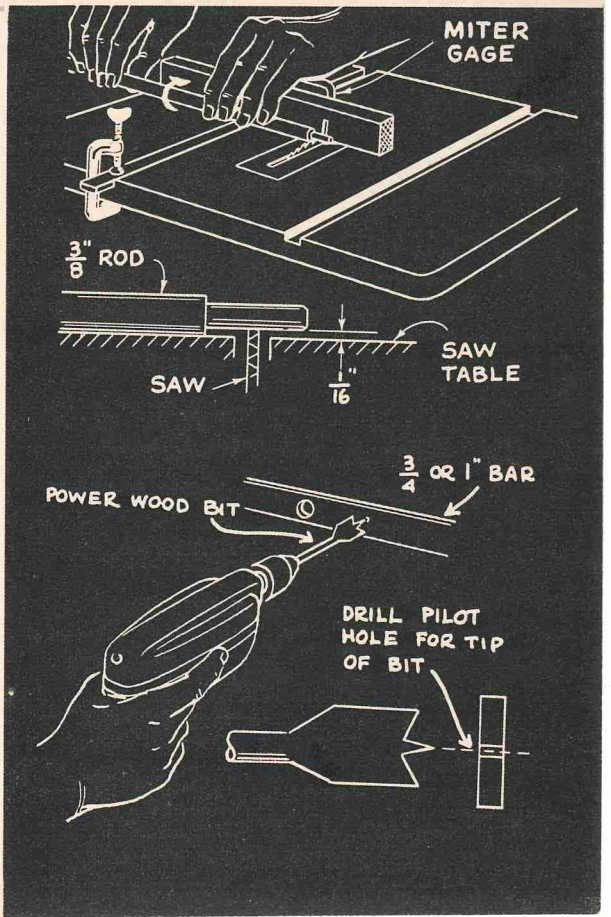
POWER HAND DRILL:

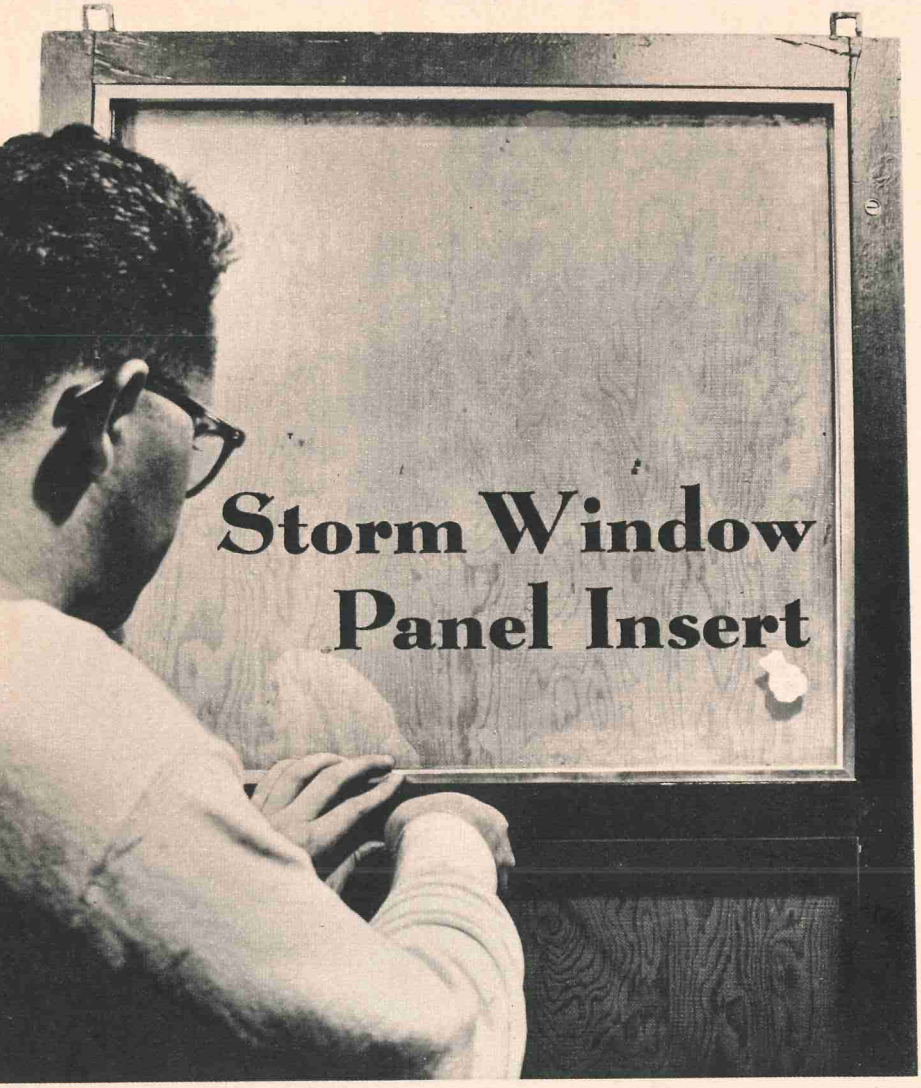
You'll have to construct a simple saddle block if you want to apply a sunswirl or damascene finish with your hand drill. Fix a dowel rod as explained in the section on drill-press work but insert the dowel rod through a hole in the saddle block. Move the drill up and down with one hand while the saddle block is moved along with the other hand. Clamp a piece of wood over the work to guide the saddle block in a straight line.

A power wood bit in the chuck of your portable drill will drill holes easily in bar stock if you drill a small pilot hole first to guide and hold the tip of the bit.

All the familiar buffing and sanding attachments for your portable drill can be used on Do-It-Yourself Aluminum. •







Storm Window Panel Insert

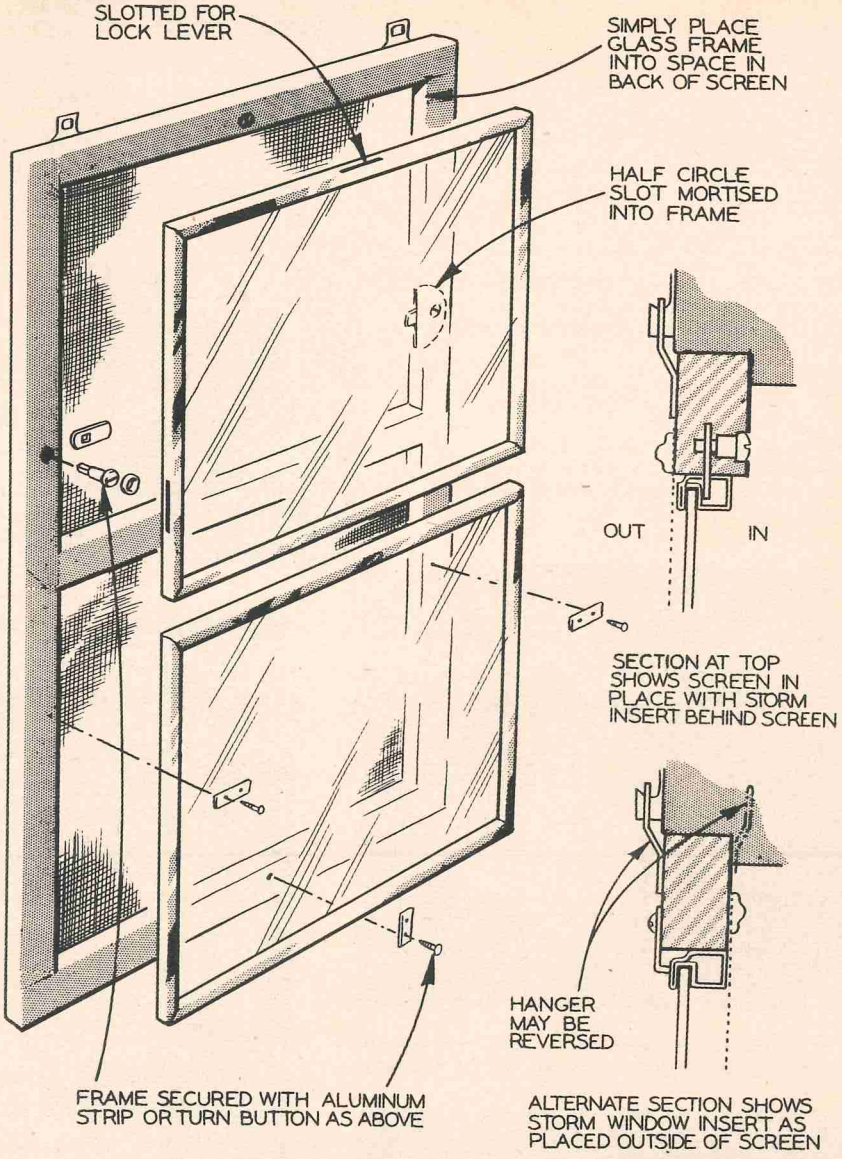
By F. V. Rodgers

Make combination screen-and-storm windows out of wooden sash screens by adding easy-to-make storm panel inserts.

HERE is a project designed to permit you to leave full screens up all year around and do away with the back-breaking job of replacing them with heavy awkward storm sashes every winter. Aluminum storm window panels are lighter and smaller than regular wooden storm sashes; they will save you money and storage space. These aluminum storm windows are designed to be put up from inside the house, washed from inside the house and, unlike existing aluminum storm and screen combinations, these storm panels are engineered to give you complete ventilation from both the upper and lower sashes through a full screen.

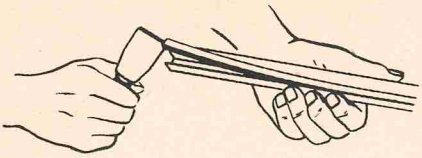
Framing for these aluminum storm window panels is made from inexpensive easy-to-work Do-It-Yourself Aluminum with ordinary hand or power tools. We have used an aluminum framing originally designed by Reynolds for their do-it-yourself screen frames. By re-adapting this material and their special corner locks we have omitted the need for nuts and bolts, corner braces, and other special hardware.

Begin your storm window panel project by checking all of your wooden screen

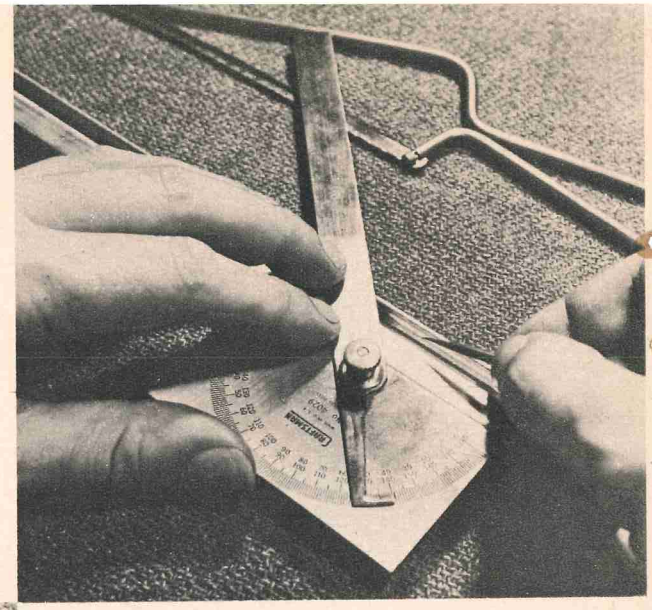


Measure inside dimensions of screen panels, then transfer measurements to a length of aluminum framing extrusion.

Photos by the author

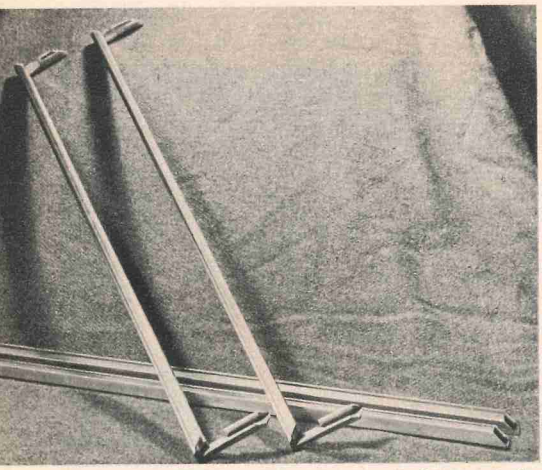


Before cutting framing member, remove U-shaped spline by sliding putty knife along top of frame underneath spline as shown.



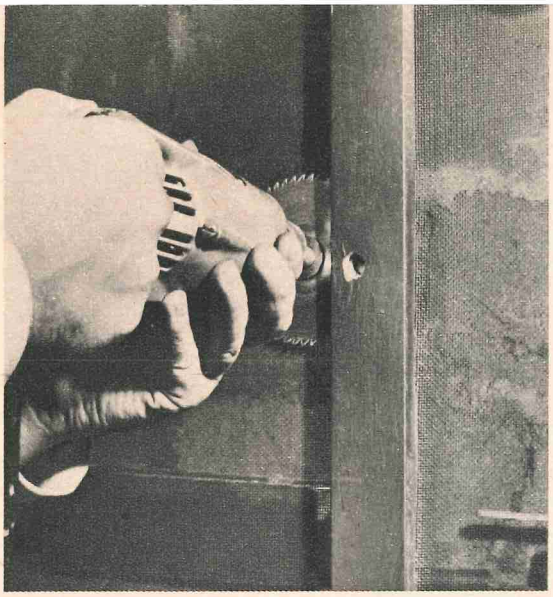
Scribe a 45-degree angle at the ends of each measured length of framing; cut along scribed lines using a fine-tooth hacksaw.

To adapt screen corner locks, mark off the flat section of the lock and cut out with a hacksaw.

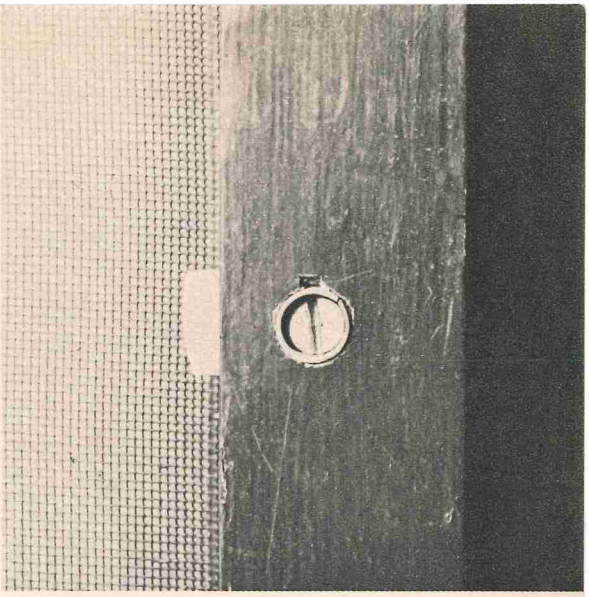


Begin assembly by pushing corner locks into ends of framing used to form top and bottom of panel.

Set insert into wood screen frame to check fit; window frame must fit tight for good insulation.



Secure panel by use of combination fastener; cut mortise in wood frame to permit play of tongue.



Countersunk collar secures fastener; tongue of fastener locks in mortised insert panel frame.

frames. Strengthen and brace screen frames and replace all damaged screening.

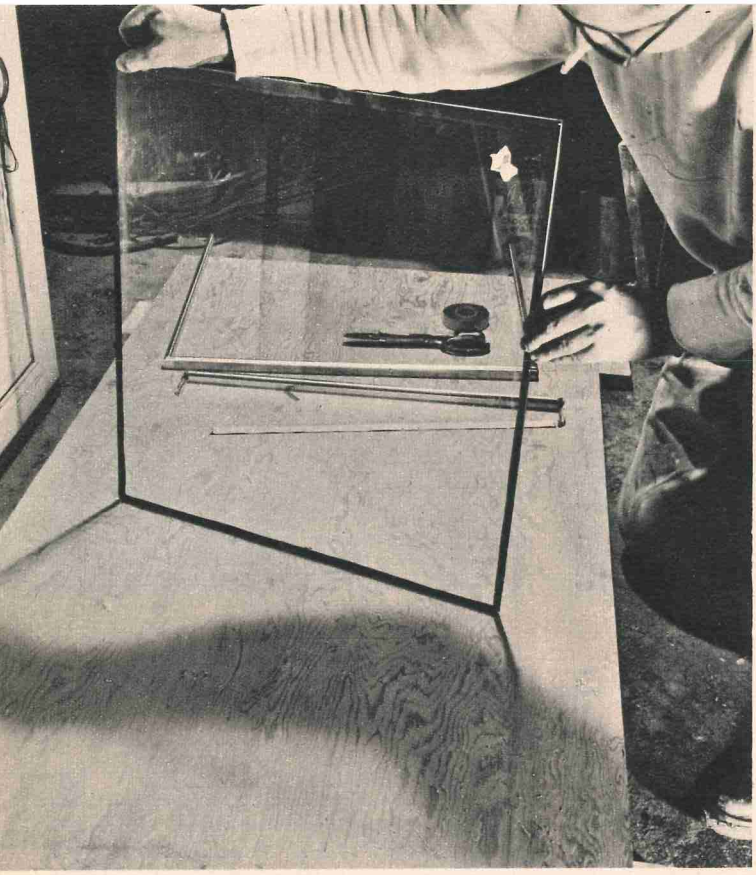
Remove the U-shaped spline from a length of aluminum framing member with a putty knife; slide the knife along the groove and lift out the spline. Measure the inside dimensions of each of your screen panels and transfer these measurements, less $\frac{1}{16}$ of an inch, to the aluminum framing member. Scribe a 45-degree angle at the ends of each measured length of framing. (Be sure that the framing member is marked and held in the proper position—the mitre must be cut across the narrow part of the framing member to form storm sash and for proper alignment to set in pane of glass.) Cut the framing members along the scribe lines using a fine-tooth hacksaw. Smooth sharp edges and burrs with a file or sandpaper.

To adapt the corner locks for this project, using the tongue end of a square, mark off the flat section of the corner lock and cut out with a hacksaw. Smooth with file and check for fit in aluminum frame channel. Begin assembly by pushing cut corner locks into both ends of aluminum framing used to form top and bottom of storm window panel. Insert completed frame (without glass pane) into wood screen frame to check fit. Aluminum storm window frame must fit tight for good insulation. While the aluminum frame is in place in the screen frame, mark the wood for the type of fastener you prefer.

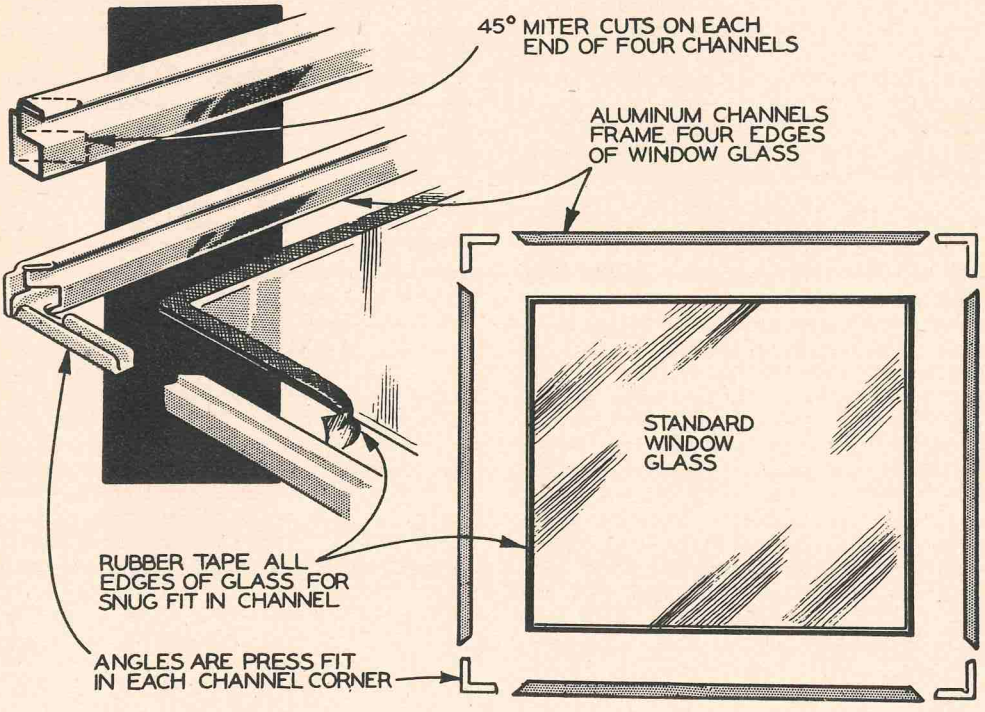
Two types of fasteners, combination and aluminum strips, are described in this project. The combination fasteners are the same type used by carpenters. They can be purchased from your local lumber dealer or woodworking shop. Combination fasteners consist of a screw with a square shank, a tongue of metal, and a round collar to hold the screw in place. Three of these fasteners will hold a panel in place securely.

To insert the fasteners, mark the wooden screen frame 3 inches above center on the left and right sides, ¾ inch in from the insides of the screen panel. At the bottom and middle rails mark the center in the same way. Drill a ½-inch diameter hole ⅝ inch deep for the screw head and collar. In the center of this ½-inch hole, drill ¼-inch hole the depth of the screw shank. (Screw will have to be cut with a hacksaw if the thickness of your screen framing is less than ¾ inch.) Determine the length and depth of slot for metal tongue by placing screw through metal tongue and inserting in drilled hole. Turn screw head left and right to measure sweep of metal tongue and mark on wood screen frame. Using a router or 3- or 4-inch circular saw, cut slot depth and length indicated by sweep of metal tongue. This slot should be located ⅜ inch back from outside (face) of screen frame.

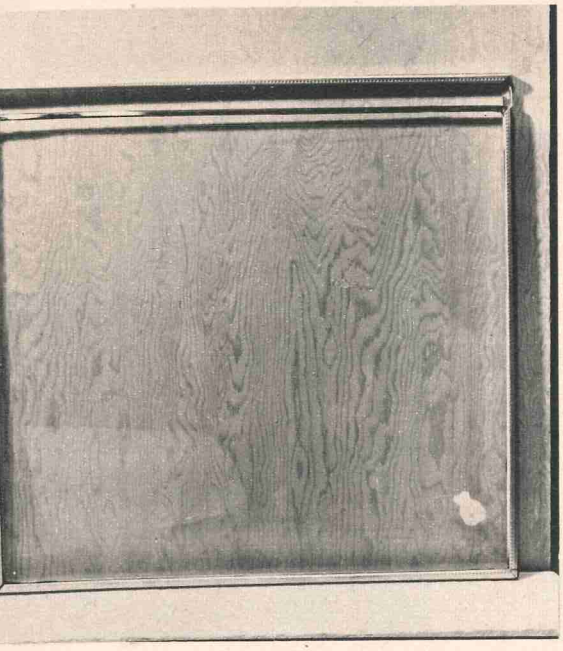
Install the combination fasteners by inserting metal tongue in slot; secure by placing screw into drilled hole and set entire unit by countersinking round collar



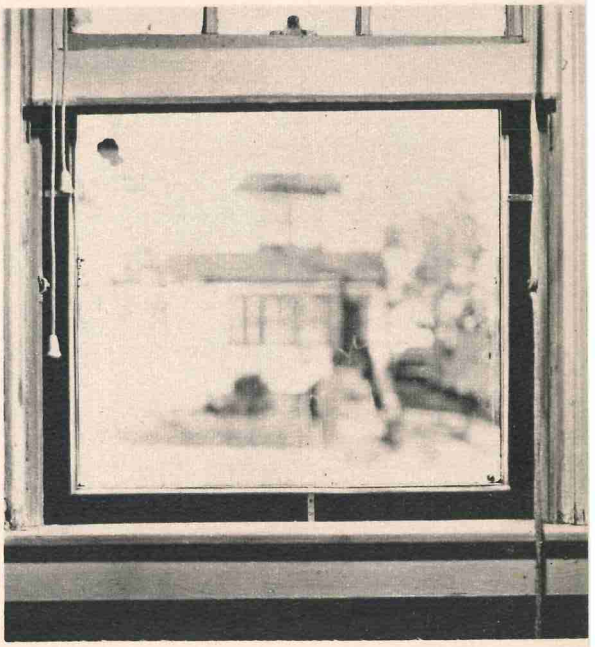
Cut storm glass pane to proper size and tape or caulk all edges of glass pane for snug fit in frame.



Assemble storm panel framing around glass; trim excess tape or caulking material with a razor.



Set completed storm window unit into wood screen frame and check for permanent, weather-tight fit.



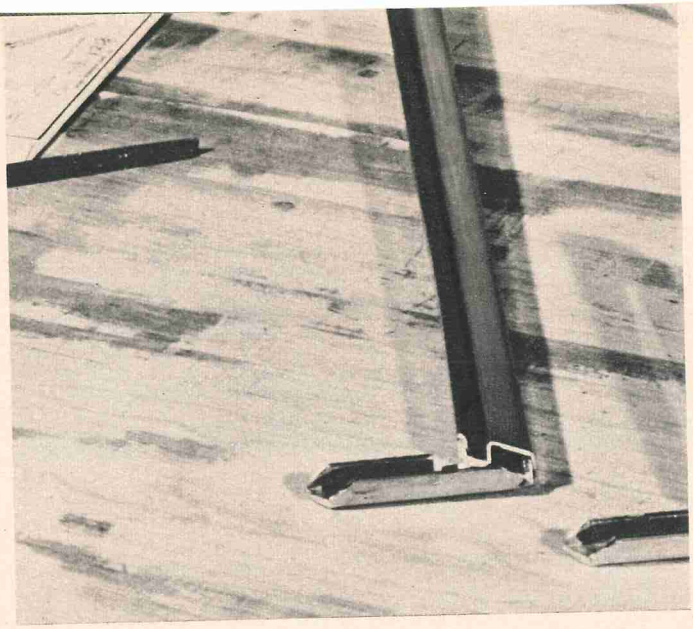
over screw head. Place the aluminum storm window frame in position and mark for metal tongue slot by rotating screw head. The metal tongue will be forced against aluminum frame and will mark proper position for cutting slot in aluminum frame to receive metal tongue.

Simpler fastenings can be made from L-shaped aluminum flat corner braces by cutting them into strips or tongues. Position the aluminum tongues 3 inches above center on left and right wood screen frame member and mark around them to countersink them $\frac{1}{16}$ inch to hold firmly. Do the same at the bottom and center rails of the screen. Remove aluminum strips and cut grooves to size with ¼-inch wool chisel. Re-position aluminum strips and secure in place with flathead aluminum screws. Be sure to use aluminum hardware to prevent rust and corrosion.

Measure height and width of aluminum frames and allow ¼ inch all around for frame channels and caulking to cut and fit storm glass panes in frame. Apply electrician's rubber tape, black adhesive tape, or regular caulking material to the edges of the glass on four sides. The tape will adhere better if you clean the edge of the glass with a dry cleaning fluid first. If two thicknesses of tape are required to fill the aluminum groove, stick the separate pieces together before applying to the edge of the glass. The tape or caulking material will cushion the glass, make it fit more tightly and seal against the weather.

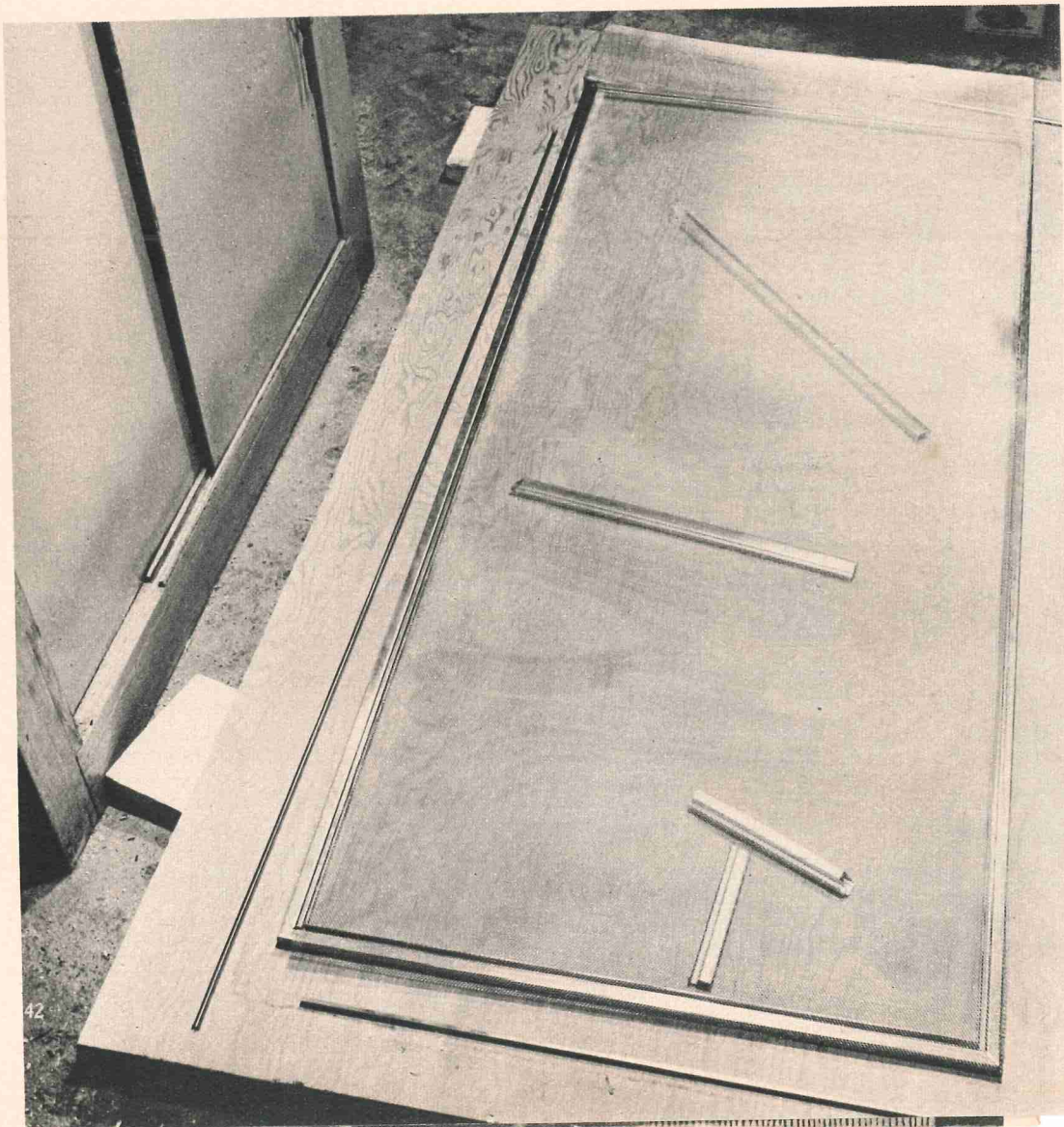
Remove aluminum storm panel frame from the wooden screen frame and disassemble. Leave the corner locks in the bottom and top framing members. Carefully insert the glass panel into left and right side aluminum frame members and join sides by pushing corner locks of the bottom framing member into the side members. Follow the same procedure to join sides and bottom to top framing member. A few light taps with a rubber mallet or plastic hammer will help tighten and close up joints. Trim excess tape or caulking material from frame with a razor or sharp pocket knife.

Set completed storm window unit into wood screen frame and check for fit and fastening alignment. Sand, then paint wood frame and screen cloth with liquid aluminum paint. After sufficient time for drying, re-hang screen. Insert storm panels from inside the house. Caulk all spaces between screen frame and window sashes for weather-tight permanent fit. •



Cut screen framing members to desired length. Miter corners and insert corner locks to assemble.

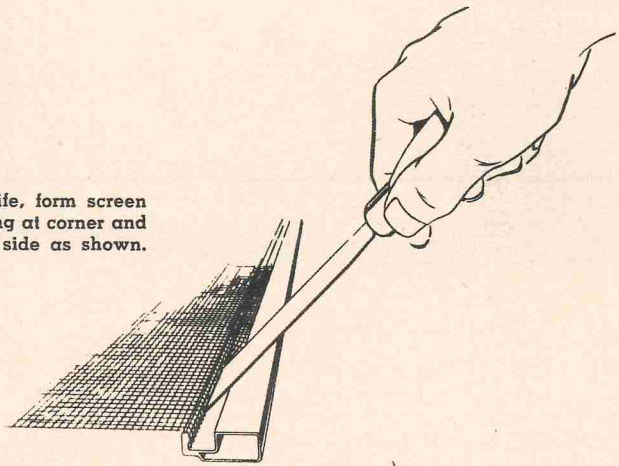
Assemble screen frame and cut aluminum screen cloth to same size as outside dimensions of the frame.



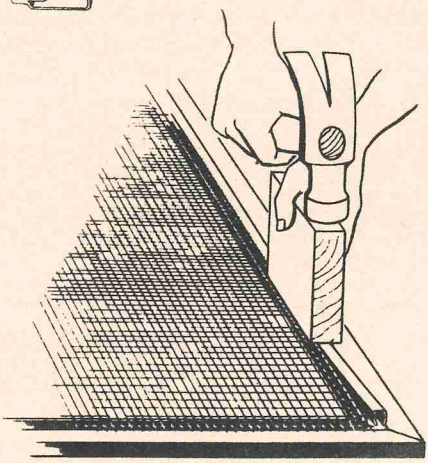
the groove to lift out the spline without bending or kinking.) Mark your framing members $\frac{1}{16}$ inch shorter than the height and width measured in the storm door opening. Scribe a 45-degree angle in from these marks and be sure that the framing member is held in the proper position. The spline groove must be on the inside perimeter of the assembled framing for proper alignment of screening.

Using a fine-tooth hacksaw or coping saw, cut framing members along scribe lines. Smooth and remove burrs and sharp edges with a small file, sandpaper, or pocket knife. Assemble prepared framing members to check fit in door panel and to mark screen frame for slots to hold combination fasteners before screening is inserted. A rubber mallet or plastic-headed hammer is used to drive the corner locks into the end of one frame member. Insert corner lock into other end of frame member and secure by driving home. In this fashion secure corner locks in the ends of both top and bottom frame members and join to sides. Completed screen frame (without screening) is inserted into door frame opening to check fit. The frame should fit tight to effectively keep out insects. While the aluminum frame is in place in the storm door opening, you can mark the door frame for the type of fasteners you prefer.

Two types of fasteners—combination and aluminum strips—are described in this project. The combination fasteners can be purchased from your local lumber dealer or woodworking shop. Combination fasteners consist of a screw with a square shank (no threads), a tongue of metal and a round collar to hold the countersunk



Using a putty knife, form screen into groove, starting at corner and proceeding down side as shown.



Use a hammer and a block of wood to drive spline into the groove, anchoring screen in frame.

screw in place. To insert the combination screw fasteners, mark the door frame 3 inches to 5 inches above the center on the left and right sides, ¾ inch in from the opening. In the same manner, mark the center at the bottom of the opening. Drill ½-inch-diameter hole ⅝ inch deep to countersink screw head and collar. In the center of the ½-inch hole drill a ¼-inch hole the depth of the screw shank. (Screw shank will have to be cut with a hacksaw if the door frame is less than ¾ inch thick.) Determine the depth and length of the slot for the metal tongue by inserting screw through square opening in tongue and placing this unit in drilled screw hole. Turn screw head left and right to measure sweep of tongue and mark on door frame. Mount a 3-inch or 4-inch circular saw in power hand tool to cut tongue slot to proper depth and length indicated on door frame. This slot should be located ⅜ inch back from outside (face) of the door frame in the panel opening.

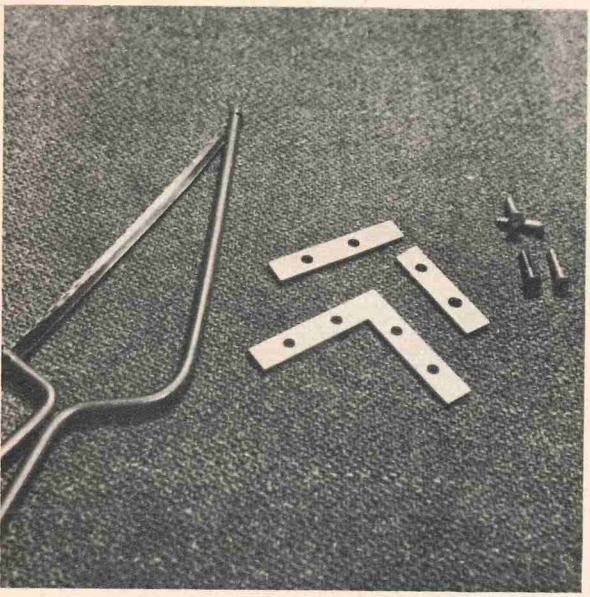
Install the combination fasteners by inserting the metal tongue into the slot until the square hole lines up with the screw hole; secure by placing square shank screw into hole through square opening in metal tongue and lock in place by countersinking round collar over rim projecting on screw head.

Replace screen frame in door opening and mark aluminum frame by rotating screw head. Metal tongue will be forced against aluminum frame and will mark proper position for cutting slot in framing member to receive the metal tongue and lock frame in place.

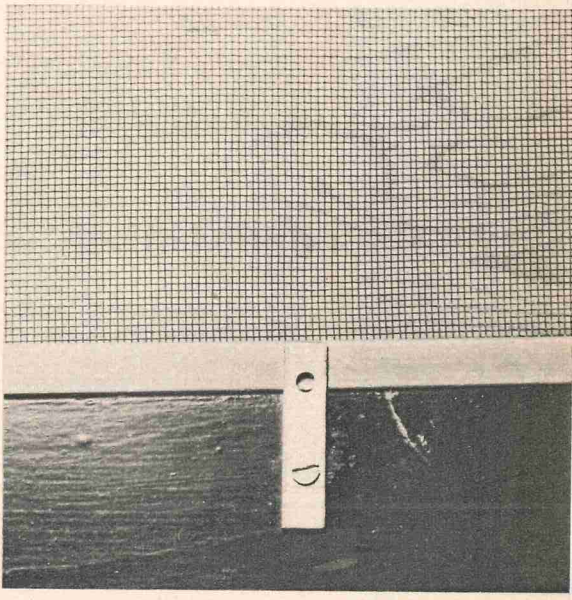
Simpler fastenings can be made from L-shaped aluminum flat corner braces by cutting them into strips. For this method, mark wooden door frames as described above. Position your aluminum strips and

The completed aluminum screen panel is placed in door from inside house and secured with fasteners.

Cut L-shaped aluminum flat corner braces into strips to make simple fasteners to hold panel.



Countersink the strip fasteners enough to hold firmly; secure with flat-head aluminum screws.



mark around them to countersink strips $\frac{1}{16}$ inch to hold firmly. Remove the aluminum strips and cut out grooves with ¼-inch wood chisel. Re-position the aluminum strips and secure in place with flat-head aluminum screws.

Remove the aluminum screen frame from the door and place on a cleared surface, groove side up, to install screen cloth. Place the aluminum screen cloth on the frame and cut to the same size as the outside dimensions of the frame. Cut carefully between two wires to insure a straight and square piece. Keeping the screen cloth square with frame, line up screen edge with outside edge of spline groove at one end and one side. Place some wooden blocks or tools on top of screen to hold in place. Using a putty knife or tool for forming screen into groove, start at one corner and proceed down long side of the frame. The screen cloth is to fit down the inside edge of the groove only. Complete the operation along one side of the screen, then cut off excess screen cloth along a line even with the outside edge of the spline groove on the adjacent leg. Replace the edge of the screen cloth that has been formed to lay in the spline groove and drive the spline into the groove over the screen cloth. Use a hammer and a block of wood. Be sure that splines have been measured and cut to form butt joint assembly at corners.

Following the same procedure, form the cloth on the two short sides of the aluminum frame. Cut off the excess screen cloth and insert the splines.

Before you replace the aluminum screen panel, carry your modernization project a step further. Sand and smooth the wood storm door, then paint with liquid aluminum. Allow sufficient time for the paint to dry, install your new screen panel and secure with the fasteners. •

Photos by the author

Storm Door Panel

By F. V. Rodgers

With an inter-changeable storm panel for your wood screen door you can leave the same wood door frame up year-round.

CARRY your entrance modernization a step further and, in addition to the aluminum screen panel, make a lightweight aluminum storm panel for your wood door. This is a simple and inexpensive project designed to use the same type of aluminum framing as the screen panel project.

This inter-changeable panel will permit you to leave the same wood door frame up year-round and requires no special maintenance or painting. The storm panel is designed to be adapted to your present storm door through the use of Do-It-Yourself Aluminum screen and storm framing. In this project we have combined the two types of framing to provide a strong dur-

able panel and to provide a variety of designs in window panes.

The aluminum framing for this storm panel is easily assembled with corner locks. Combination fasteners or simple aluminum strips lock the panel in place and cannot be seen or tampered with from outside the door.

Begin the construction of your storm panel by removing the present storm or screen section from the wood door frame. (The design of wood combination-storm-and-screen doors usually provides for the removal of this section.) Measure the height and width of the opening in the door frame. Now, remove the U-shaped spline from a length of aluminum screen framing with a putty knife or screw driver.

Mark the framing members $\frac{1}{16}$ inch shorter than height and width measured in frame opening. Use a scriber or stylus to mark a 45° angle in from these marks. Be sure that the framing member is marked and held in the proper position; the miter must be cut across the narrow part of the framing member to form the storm panel frame and to provide a channel to hold the glass panes. Cut the framing members along the scribe marks using a fine-tooth hacksaw, coping saw or plumber's saw. Smooth and remove all sharp edges and burrs with a fine file or sandpaper.

Take four of the screen-frame corner locks and mark off the inner flat section using the tongue end of a square as a marking guide. Cut out this section and remove burrs as described above. Assemble frame temporarily to check fit and squareness in wood door frame.

A rubber mallet or plastic-head hammer is used to drive the corner lock into the end of a top frame member. Insert corner lock into other end of frame member and secure by driving home. Join the top frame member to sides and in same manner described above complete bottom section.

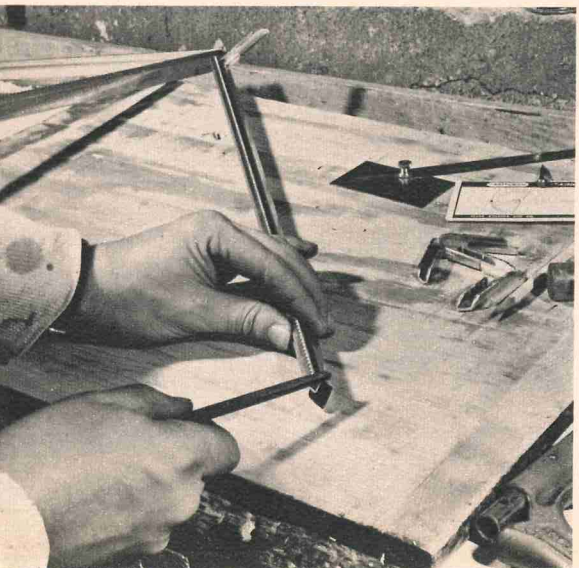
Storm frame panel (without glass) is inserted into door frame opening to check fit and to mark frame for combination or aluminum-strip fasteners. The storm frame panel should fit snug to insure cold-weather seal. Now, while the storm frame is in place, mark the door opening for the type of fastener you prefer.

To insert combination screw fasteners, mark the door frame three to five inches above the center on the left and right insides of the door frame opening. Mark the center of the bottom rail ¾ inch in from the door opening, so that a total of three fasteners are provided for, to hold the panel securely. Drill a ½-inch diameter hole ⅝ inch deep to countersink screw head and collar. In the center of the ½-inch hole drill a hole ⅜ inch in diameter the depth of the screw shank. (Screw shank will have to be cut with a hacksaw if door frame is less than ¾ inch thick.)

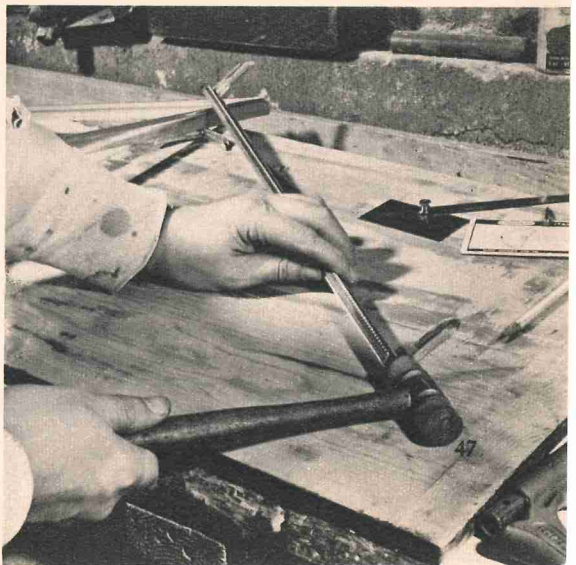
Determine the depth and sweep of tongue slot by inserting screw through square opening in tongue and placing in drilled hole. Rotate screw left and right to measure sweep of metal tongue and mark on door frame. Mount a 3- or 4-inch circular saw blade in hand power tool and cut tongue slot to proper depth and length indicated on door frame in panel opening.

Install the combination fasteners by inserting the tongue into the slot in the door frame until the square hole lines up with the screw hole; secure by placing the square shank screw into hole and through

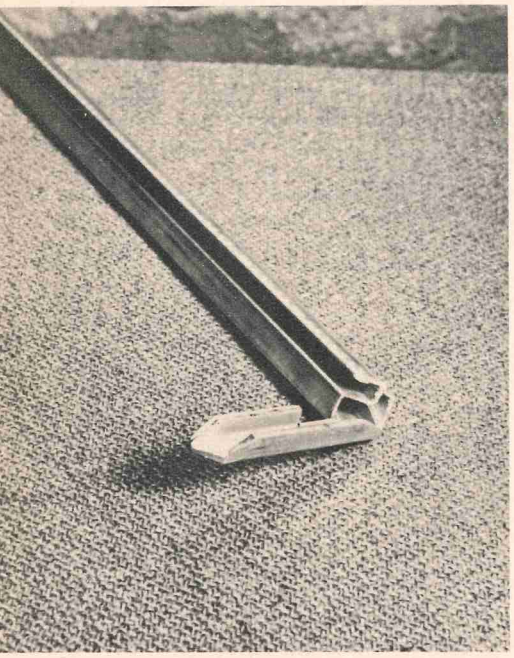
After cutting framing members to length, miter corners; remove any burrs with file or sandpaper.



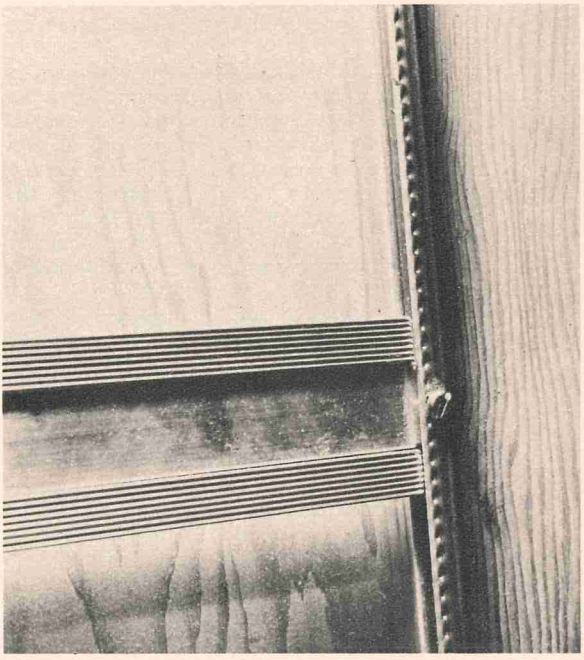
Seat adapted screen corner locks in top and bottom frame members with aid of soft-faced mallet.



Aluminum frame members must be mitered so that channel in which glass will be set faces inward.



Storm section members, joined back-to-back, are used as horizontal and vertical panel dividers.



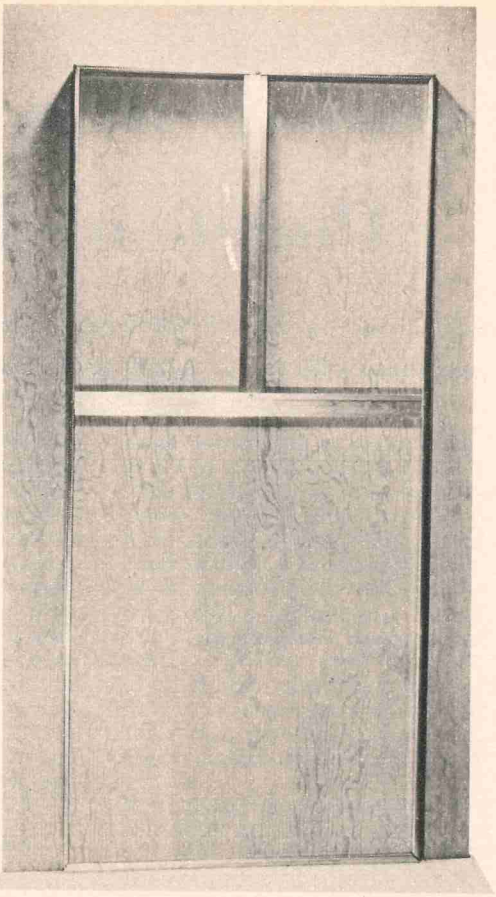
the square opening in the metal tongue. Lock the assembly into place by countersinking the collar over the rim provided on the screw head.

Replace the aluminum storm panel frame in the wood door frame and mark the position for the receiving slots by turning the screw and forcing the metal tongue against the aluminum frame. Remove frame. Drill hole to provide start for hacksaw blade or file to cut receiver slot. Smooth edges and check fit in door frame again.

Simpler fastenings are made from the L-shaped aluminum corner braces available at all hardware stores. These braces are cut into strips and screwed to the door frame in the same position as the combination fasteners. A tighter and neater job can be done by grooving the wood door frame the width and depth of the aluminum strips used.

Remove the storm panel frame from the door opening and place on a cleared flat surface to mark and measure for the window panes. A variety of designs are possible. We have used an inverted T to provide a wide and unobstructed view through the door. To make this design, measure and mark a point half-way up the frame from the bottom rail. Add 4 inches to this mark so that your horizontal dividing rail will be slightly above center. Follow this procedure on both sides of the aluminum frame. At the top rail measure and mark off the exact center to locate your vertical divider rail. (You can measure from inside the frame or use the overall measurements from left to right outside of the frame.)

At the point 4 inches above center measure the distance from the left side of the frame to the right; be sure to include the ¼-inch depth of the channel for the glass. Take a length of storm window framing and mark off the distance you have measured in the frame opening. Cut two pieces of the storm window framing. They will form the horizontal divider for the storm panel. Mark off ¼ inch on the left and right sides of these two divider strips. With a hacksaw, remove the U-shaped channel at the ¼-inch mark on both divider strips. This will leave you with a flat tongue which will fit into the channel on the assembled frame. Join the two divider strips, back-to-back, so that there is a channel at the top and bottom of this divider rail to hold the glass



With glass panes in place and all frame members locked securely, unit is ready to be installed in the wood frame door.

panes. You will see that these storm panel frames are designed so that when they are placed back-to-back properly, the U-shaped channels line up perfectly to hold the glass. This same system can be extended to make a storm panel with four or six panes of glass.

Clamp the horizontal divider strips together securely and place in the marked position in the aluminum storm frame. Drill a $\frac{1}{16}$-inch hole through the outside of the frame into the joined divider strips. Secure this section with a sheet metal screw and follow the same procedure for the other side of the frame. Drill two holes evenly spaced in the horizontal divider strip and lock together with aluminum nuts and bolts. Remove the clamps and the divider strip is in the proper position.

The upper section of the storm panel is divided in the same fashion.

Now, with the horizontal and vertical divider sections in place, measure the openings, cut glass to fit these sections.

A special feature of this storm panel design makes it unnecessary for you to disassemble the whole unit to insert the glass panes. Before you insert the glass, apply electrician's rubber tape, a black adhesive tape, or the regular caulking material, to all four edges of the glass panes.

Now, insert the lower, larger pane first. By removing only the bottom rail (be sure that the corner locks come out with this piece) you can slide and work the glass panel into position. Be sure to work on a flat, padded surface. After the glass is in position, replace the bottom rail and tap gently with a rubber mallet to lock in position, if necessary. You can lock the corner locks into position by drilling holes through the ends of the framing members and inserting a sheet metal screw to prevent possible slipping.

The two top panes of glass are inserted in the same manner as described above. Here it will not be necessary to lock the corner locks with a sheet metal screw, because your top rail is joined to the vertical divider by a sheet metal screw at the center and will prevent slipping.

The storm panel section is ready to be inserted in the door. If you have made any slight errors in your measurements, you can caulk around any cracks to keep out draft. Liquid aluminum paint can be used on the wood door to complete the modernization project. •

Screening-in a Porch or Breezeway

Screen-in your porch or breezeway and add an outdoor living room to your house with screen panels made from easy-to-work aluminum.

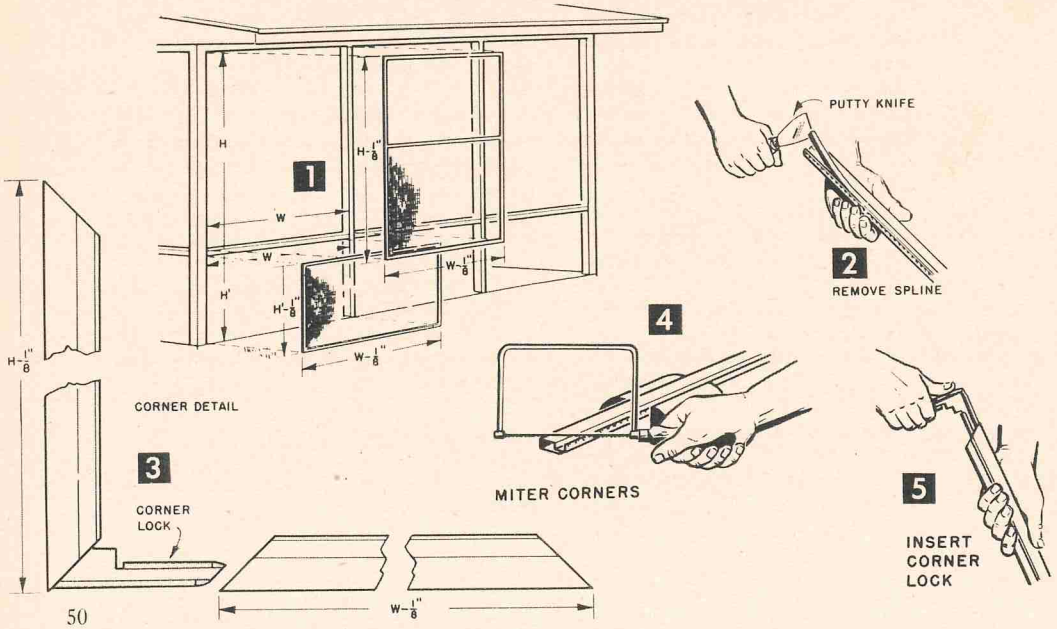
OUTDOOR living is in style these days. Whether you already have a porch to be screened-in or you want to add an outdoor living room to your present house, you can quickly build screen panels from Do-It-Yourself Aluminum screen sections with hand or power woodworking tools. When you build your screen panels from Do-It-Yourself screen sections, there are no tricky joints to make. Corner locking clips join side and end frames with built-in accuracy. With aluminum woven screen cloth, you can build your own panels for about one-third the cost of custom-made screens.

Plan screen panel sizes, meeting rails and door location before picking up materials from your local hardware dealer. Whether your present porch already has a partial stub wall around it or is open from floor to roof beams, plan equal width panels at sides and end. Draw a plan of your porch to scale, using graph paper. Keep in mind while planning that woven screen cloth is available in 24, 26, 28, 30, 32, 36, 42 and 48 inch widths. Also consider that screen section comes in 6, 8 and 12 foot lengths. If possible, plan to cut one side and one end or two ends out of one length of screen section using a screen cloth width that will minimize waste. If your porch already has a stub wall or railing around it, the doorway location is already established. However, if you have a choice, locate the doorway as one of the regular panels. Your porch will look better if panels are evenly spaced around the porch. Fig. 13 shows common porch shapes with vertical meeting rails and doors planned for a mimimum number of screen panels.

CONSTRUCTING FRAME AND SCREEN PANEL

1. Measure screen panel openings. Side frames should equal the opening's height less ⅛ inch. End frames should equal opening's width less ⅛ inch.

2. Splines are furnished with the screen



sections and are removed with a putty knife. Lay splines aside until later.

3. Mark frame members for cutting according to measurements obtained from Step No. 1. The ⅛-inch clearance permits easy installation. Scribe 45° angles at ends of frame members. Spline groove is along inside of frame and faces out when screens are in place.

4. Mitre corners by cutting mitres with fine-toothed coping or hack saw. Smooth end cut with a small file or garnet paper.

5. Start assembly of frame by pushing corner locks into ends of frame member. A gentle tapping with a hammer seats corner locks.

6. Assemble end member with corner locks to side members. Push corner locks into remaining end member and complete frame assembly. Cut splines for end frame members to full length of groove. Splines for side frame members butt-joint against end frame splines (see Fig. 12).

7. Large screens may require a reinforcing channel between side frame members. Trim channel to fit frame members and drill hole in end. Position channel brace parallel with end frame members and punch hole in side frame member with 6-penny nail. Screw channel to frame with No. 6 x ⅜-inch aluminum tapping screws. Screen section may be used instead of channel as the reinforcing brace for greater rigidity where screen panels are wider than 30 inches.

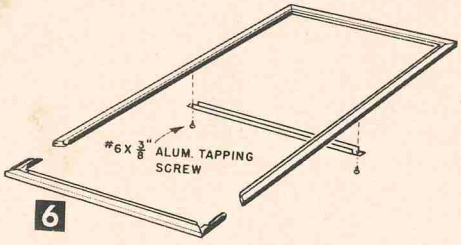
8. Roll woven screen cloth over frame and square cross wires with end frame members. Cut screen cloth to length between two screen wires.

9. Lay frame on cleared bench top, floor or ping-pong table. Check corners of frame with a carpenter's steel square to make sure they are square before lining up edge of screen cloth with outside edge of spline groove along one side. Wood blocks across corners help to keep screen cloth from rolling up and moving about.

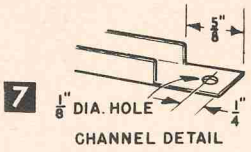
10. Form the edge of the screen cloth into the spline groove with a putty knife. A block of wood on top of screen cloth and along inside edge of spline groove helps to form a sharp bend in screen cloth's edge. Scrap pieces of screen section keep surface level with frame members. Start forming screen cloth at one end of groove and work down full length. CAUTION: Screen cloth fits down *inside* edge of spline groove only. Follow the same screen wire along edge to prevent pulling too much of the edge into groove and bowing frame. Short pieces of scrap spline pressed temporarily in place help to hold screen cloth from moving about as work progresses.

11. Stretch screen cloth across frame and trim edge of screen cloth even with outside edge of spline groove. Form edge of screen cloth into spline groove as you did along first side. Align ends of screen cloth with frame and temporarily fasten both sides in place with short scrap sections of spline. Trim ends of screen cloth along outside edge of spline groove. Form ends of screen cloth into spline groove.

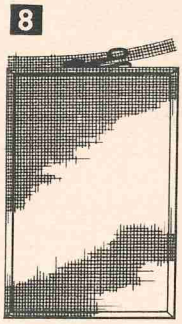
12. Drive both end splines into grooves of frame end members with a block and hammer. Remove short temporary splines along sides and replace with full-length splines, butt-jointing corners of splines as shown.

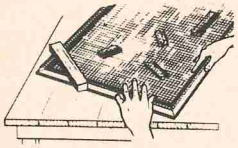


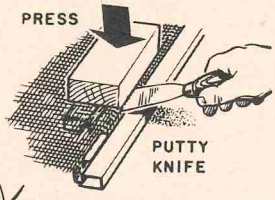
6



7

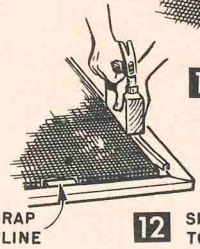

8

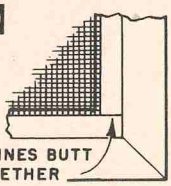

9



10


11





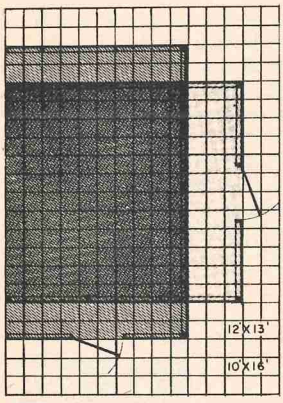
12

SUPPORTING THE SCREEN PANELS

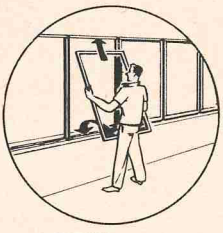
Vertical meeting rails divide porch areas into uniform areas, support the screen panels and hold them in place. For a porch that is largely masonry, you may want to use an all-aluminum T-section formed by riveting two ⅛ x ¾ x ¾-inch angles back to back (Fig. 14). Angle clips riveted to the back of the T-section fasten the meeting rail in place at top and bottom. A simple method for holding the screen panel in place is to slip the panel up into a recess along the top formed between an angle and quarter-round mold. The recess is deep enough to hold the screen panel as it slips down to rest in a ½-inch channel across the bottom (Fig. 14A). Attach matching angles at the posts. If your porch is high off the ground, locate the open side of the angle in toward the porch so you can slip the screen panels in from the porch side.

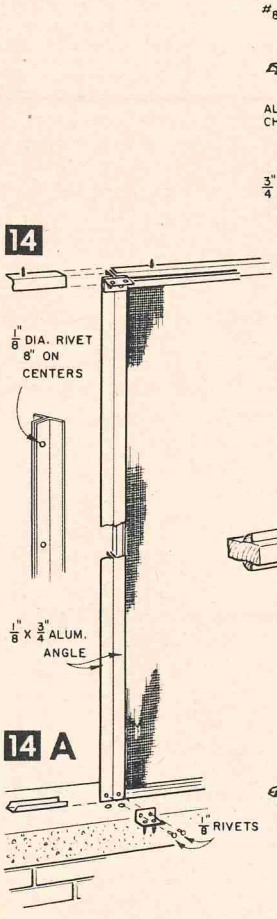
For full-height openings, 2 x 4's with rabbeted edges or with a recess formed by nailing quarter-round molding back of the edge are easy-to-make meeting rails. Horizontal meeting rail at chair height helps to prevent damage to screens and divides the vertical height into more manageable panel sizes. Vertical 2 x 4 meeting rails can also be used between the top of a wood railing or stub wall and underside of porch roof. Common screen hooks will hold screen panels in place (Fig. 15A). To install hooks, punch a hole through the screen section close to the spline groove with a 4-penny nail. Screw a small screen hook into the hole until it begins to dimple the opposite side. Chisel or rasp away part of the quarter-round molding to let hook past. Locate hook eye where it will hold screen panel securely.

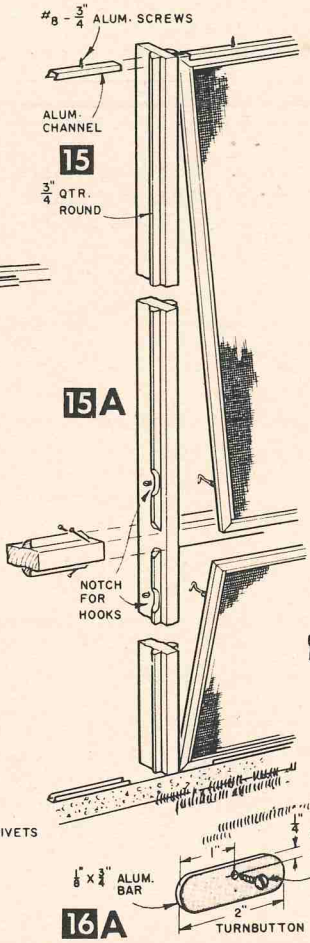
Another method for holding screen panels in place is to make turnbuttons from ⅛ x ¾-inch aluminum bar stock (Fig. 16A). The off-center hole permits screen panels to be removed along one side and then the other of the narrow meeting rail left between rabbeted edge of 2 x 4.

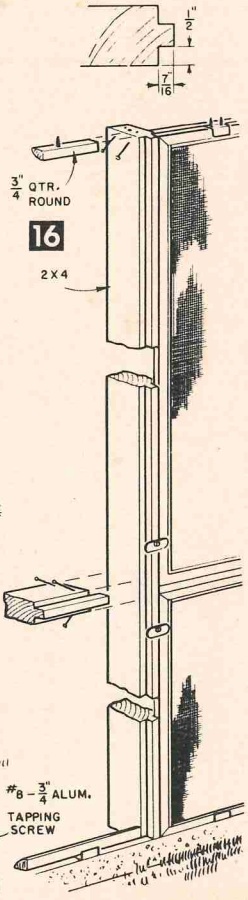


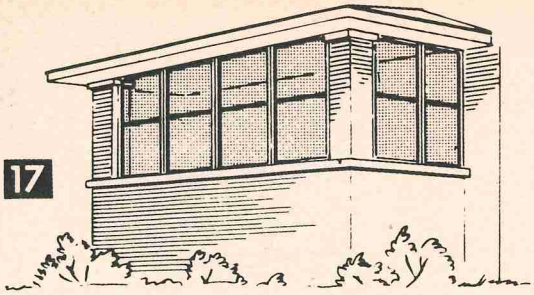
13 PORCH LAYOUT

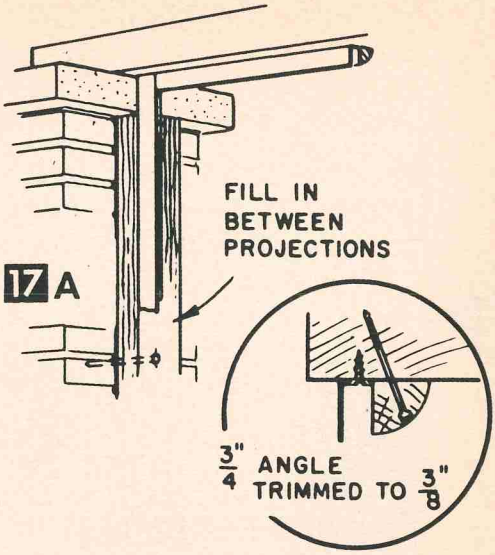

INSERTING SCREENS

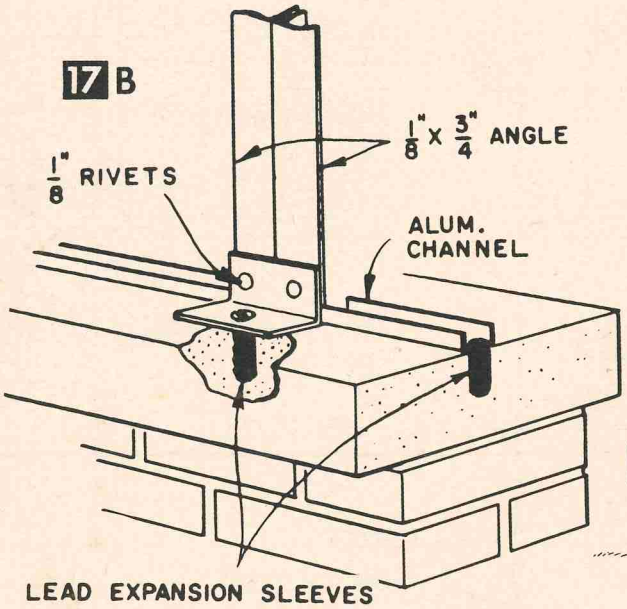


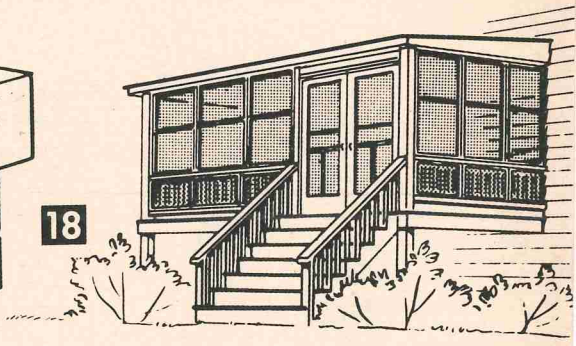










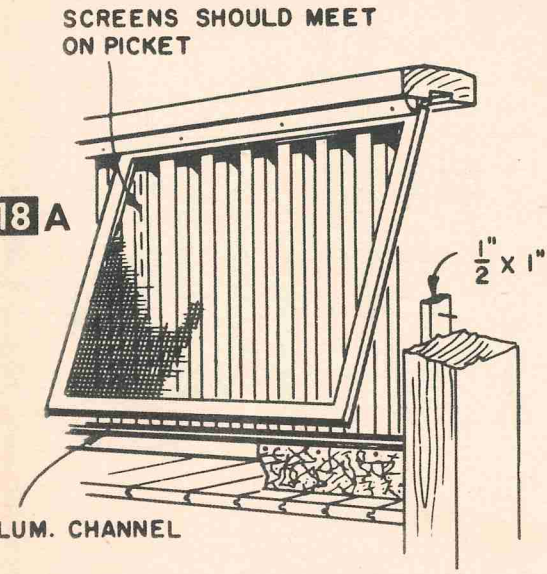


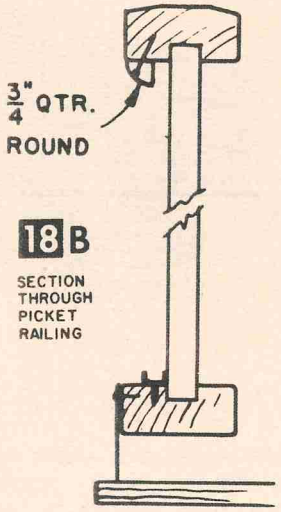
SCREENS FOR STUB-WALL PORCHES

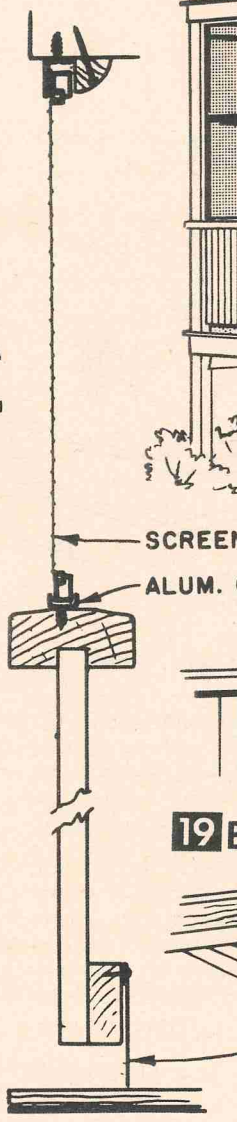
Screening-in an existing porch with stub walls may be more of a problem than adding full-height screens between floor and roof. Where posts and stub wall are stone, stucco or brick, consider using aluminum parts for holding the screen panels in place as indicated in Fig. 14. Along the sides, you may have to use a wood filler strip between post and aluminum angle. Where the post surface is rough, uneven or tapered, run a heavy bead of caulking compound between angle and post. Quarter-round molding and ⅛ x ¾ x ¾-inch aluminum angle form a recess at the top deep enough to take screen panels before they drop down into the channel along the bottom. Channel section is the same channel used for reinforcing the screen panels and can be screwed into lead expansion sleeves, the same as the angle clips holding T-section in place. Use No. 8 x ¾-inch aluminum screws and ⅜ O.D. x ¾-inch lead sleeves in ⅜-inch diameter holes. A carbide-tipped masonry bit in a portable electric drill makes short work of these holes into the masonry cap.

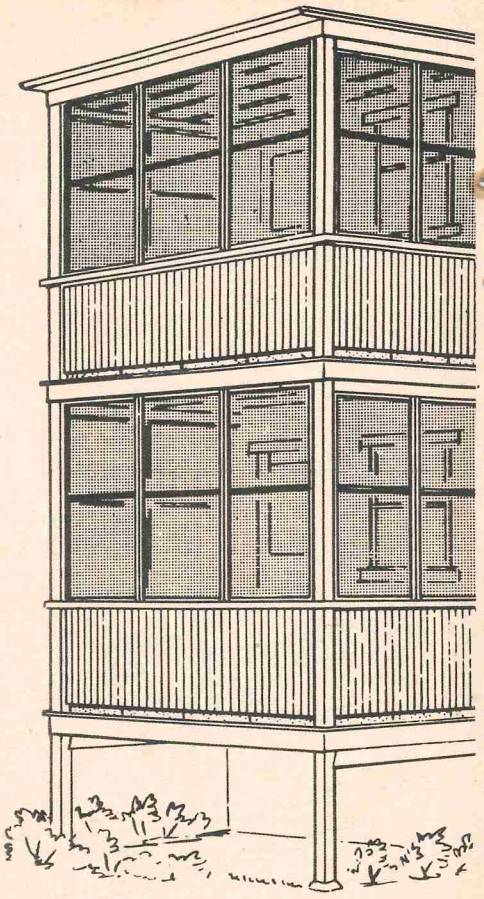
Many wooden porches have a wood rail between posts with an open lattice or pickets between top and bottom rails. Here you can fill in the areas between the top of the upper rail and the underside of the roof with screen panels. Vertical meeting rails can be 2 x 4's (Figs. 15 and 16). To cover the areas between rails, make separate panels and slip them into place between a top recess and a channel along the bottom (Fig. 18B). These screen panels can be fitted on the outside or inside of the lattice or picket section. Along the bottom between lower rail and porch floor, cut sections of embossed aluminum sheet and screw them to lower rail.

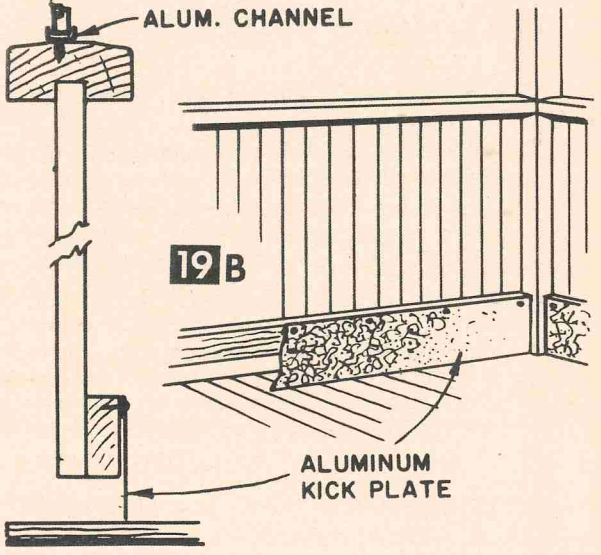
Two and three-story apartment build-





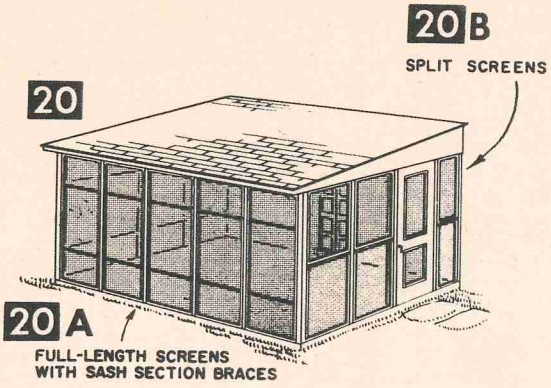


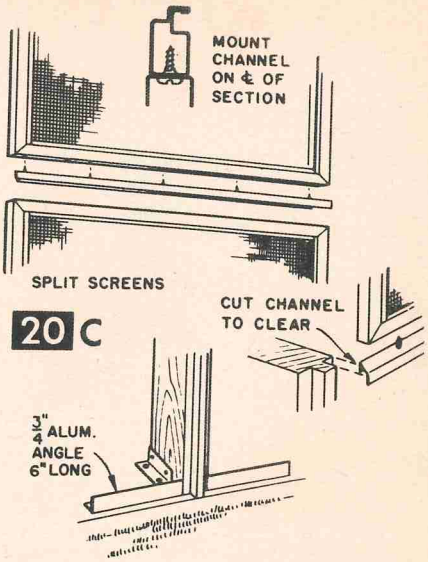


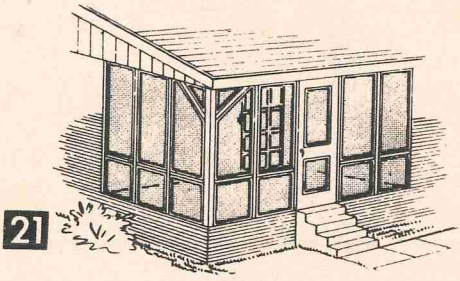


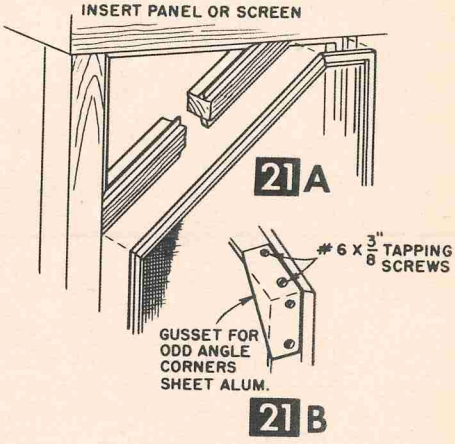
ings or multiple homes often have back porches that could be screened-in for added living convenience (Fig. 19). Many times the stub wall is covered with tongue-and-groove lumber that doesn't require screening. If this partial wall should be of open construction, you can add panels on the inside like those shown in Fig. 18A. Build in the vertical meeting rails with the top recess and bottom channel designed to permit inserting or removing screens and storm sash from the inside. Screw on strips of embossed aluminum sheet to lower rail to cover lower opening (Fig. 19B).

Frame and hang the screen or combination doors according to Fig. 30 (page 59).





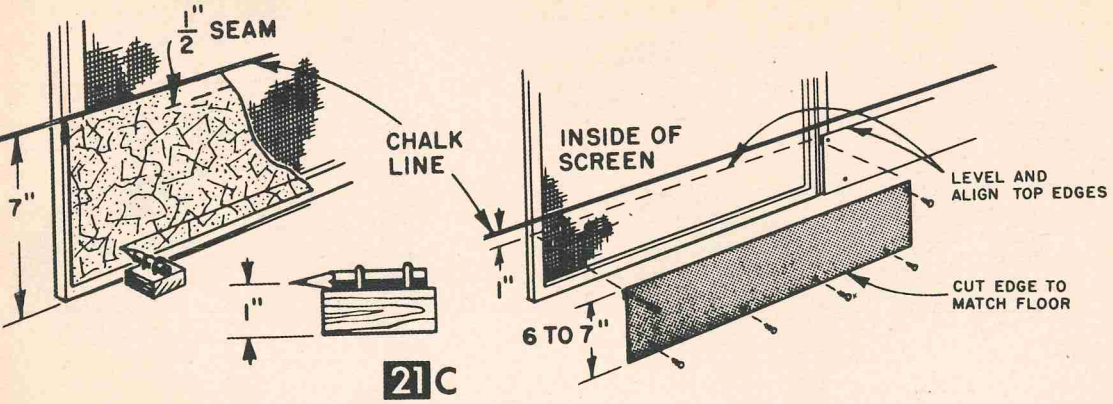




FULL-HEIGHT SCREENS FOR PORCHES

Porches or breezeways with a clear space between floor and roof may be screened-in a number of different ways. Fig. 20 shows two methods for adding full-length screens without horizontal meeting rail. This system would be desirable in areas where screen panels are removed during the winter to prevent snow from drifting into corners. When these screens are removed, only the posts and short angle clips along the floor remain and snow can be swept out easily. In Fig. 20A screen panels extend from floor to roof beam and are made from 8- or 12-foot lengths of screen section. Two sash section braces across width reinforce vertical frame members. In Fig. 20B two panels cover the full height and are joined at the center with a channel brace (Fig. 20C). Screen hooks or turnbuttons along the side are all that's necessary to hold both types of panels in place.

Horizontal meeting rails built in between vertical meeting rails permit using smaller panel sizes and protect screens from damage at chair height. Follow details for adding horizontal meeting rail as shown in Figs. 15 and 16. Separate screen panels fill upper and lower areas. If your porch framing happens to include diagonal braces at the top of posts, fabricate screen panels with a corner cut off to match the angle of the brace. Attach reinforcing gussets cut from doubled aluminum sheet or flange of 1/16 x 1 x 1-inch angle behind screen section joints as in Fig. 21B. On older homes, edges of these angular braces are often decorated in fancy designs. Probably the

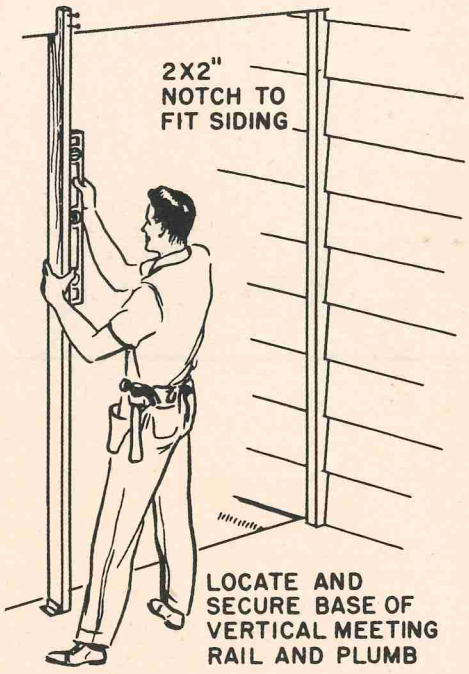


21C

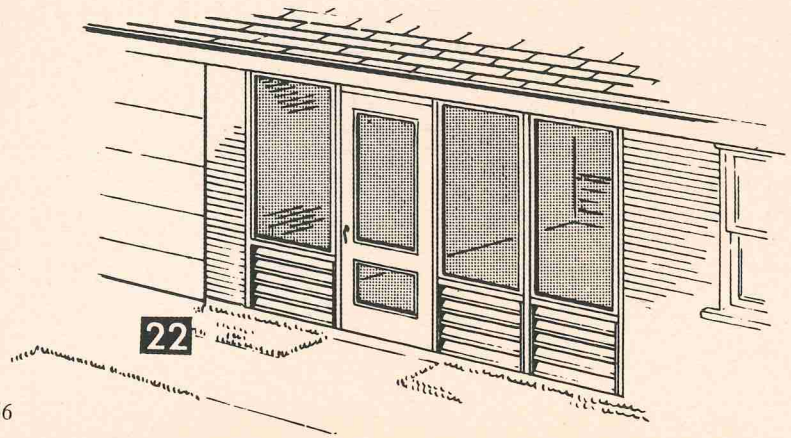
best approach if you encounter such braces is to set the screen panels out far enough to fit over the outside surface of the braces.

Breezeways can be screened-in with full-length screens using the same methods shown in Figs. 20 and 21. You can also build in a louvered stub wall as shown in Fig. 22.

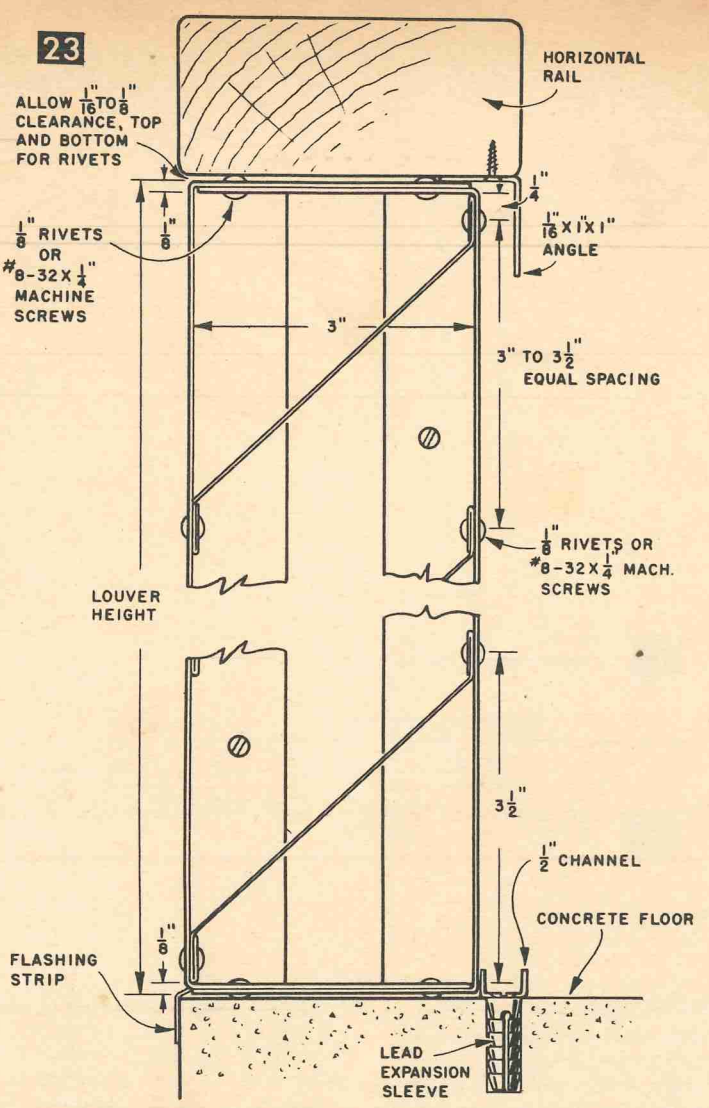
If the breezeway runs between either a house or garage with beveled drop siding, you'll want a straight side to start working from. Stand a 2 x 2 vertically in place along the drop siding and mark locations for notches to fit the siding. Fit the notched 2 x 2 to the siding and lag screw or nail it in place. If you plan to use rabbeted 2 x 4 meeting rails, rabbet the edge of this notched 2 x 2 before nailing it in place. You can add a quarter-round molding to the edge later if you use that method for attaching screen panels. When fitting vertical meeting rails, use a level to plumb it in position so screen panels will fit squarely. If you add louvers, limit distances between vertical meeting rails to 36¼ inches. Prefabricate the louver assembly and fit it in between the breezeway floor and a horizontal meeting rail (see Fig. 23). Frame and hang the door as shown.

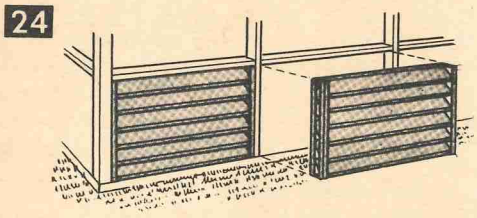


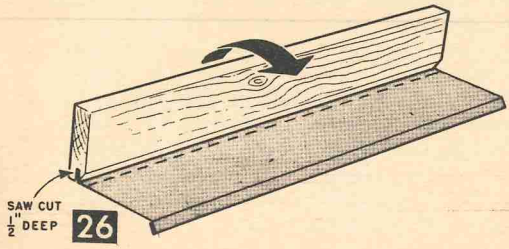
22A

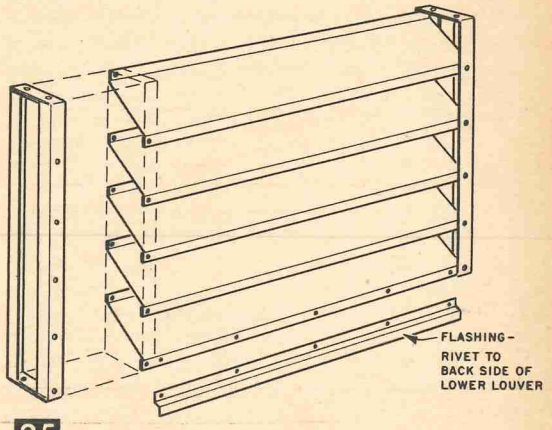


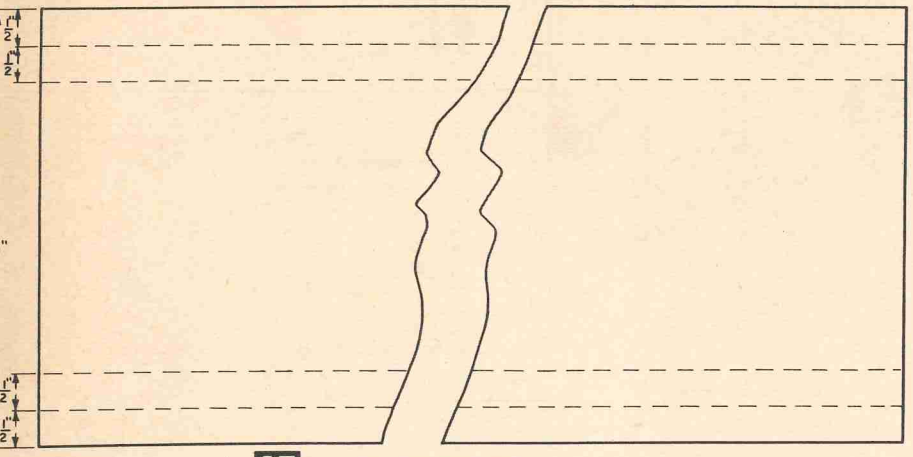
22


23
HORIZONTAL RAIL
ALLOW 1/16" TO 1/8" CLEARANCE, TOP AND BOTTOM FOR RIVETS
1/4"
1/16" X 1" X 1" ANGLE
1/8" RIVETS OR #8-32 X 1/4" MACHINE SCREWS
1/8"
3"
3" TO 3 1/2" EQUAL SPACING
1/8" RIVETS OR #8-32 X 1/4" MACH. SCREWS
LOUVER HEIGHT
3 1/2"
1/2" CHANNEL
CONCRETE FLOOR
1/8"
FLASHING STRIP
LEAD EXPANSION SLEEVE

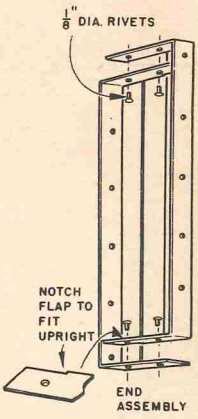

24


SAW CUT 1/2" DEEP
26

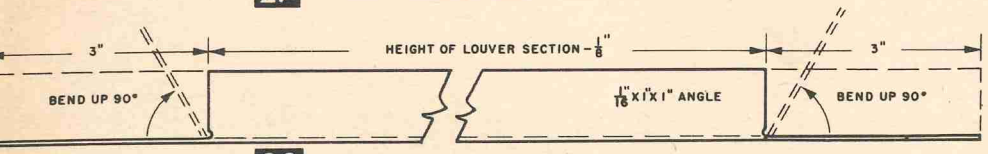

FLASHING - RIVET TO BACK SIDE OF LOWER LOUVER
25



27 LAYOUT FOR LOUVER PANEL



29

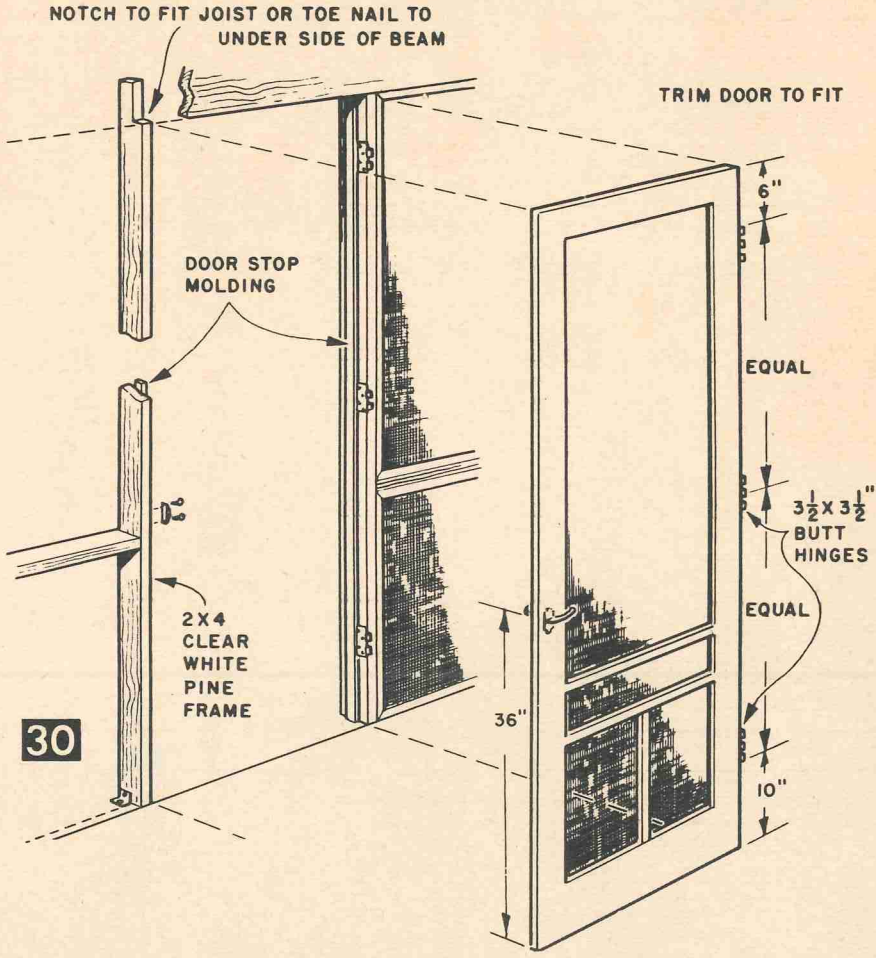


28 END PIECE 4 REQUIRED

BUILD YOUR OWN LOUVERS

Louvers for stub walls across porches or breezeways provide ventilation that can be left open in the rain and reduce the height of screen panels. Making the louvers out of aluminum saves you the problem of painting, and you won't ever have to worry about rust. The aluminum louver shown in Figs. 23 and 24 fits snugly under a 2 x 4 horizontal rail. Screws through the angle frame at each end fasten the louver to vertical rails at each side. A 1 x 1-inch angle along the top and inside forms a recess into which a panel slips before resting in the channel along the back (Fig. 23).

To make your own louvers from Do-It-Yourself Aluminum, follow the layout in Fig. 27. Length of louvers is limited to 36 inches by the sheet size available, but you can make them shorter to fit your porch plan. Bend a ½-inch seam along both sides as in Fig. 26. Bend seam edges again to match the angle shown in Fig. 23. Lay out the end pieces (Fig. 28). Bend up the ends for the end frame and cut out notches to clear the angle side (Fig. 29). It may be necessary to trim the ends of the bent flanges if the bend radius isn't sharp to meet the 3-inch dimension inside the angles (3⅛ inches outside). Lay out and centerpunch rivet locations before assembling the end frames. C-clamp end assembly together, and drill ⅛-inch holes for the rivets. Clip about 1/16 inch off the end of ⅛-inch diameter x ¼-inch rivets before riveting end assembly (Fig. 29). C-clamp the louvers with a ½ x ½ inch strip of hardwood under each flange of the louver. Drill through the end frame angle and the flange of the louver 11/64 inch diameter and assemble with No. 8-32 x ¼-inch aluminum machine screws. You can also assemble louvers with ⅛-inch diameter rivets using a steel bucking bar back of the head on the inside. If you plan to use storm sash insert in addition to screens, rivet flashing strip to lower louver to drain water over edge of porch floor. Once you get the hang of it, you can make a 6-vane louver in about two hours.



FRAMING AND HANGING SCREEN DOORS

There's no need to rough frame a door opening and add jambs around the inside of the frame as is commonly done for interior doors. Instead of structural lumber set 2 x 4's of clear trim lumber, such as straight-grained pine. Plumb the door frames carefully to maintain the correct size opening. At the top, notch frames to fit the side of roof beam or toenail it to the beam's underside. Fasten the bottom end in place with aluminum angle clips. Simply screw into a wood floor with No. 8 x ¾-inch aluminum screws or screw into ⅜-inch O.D. lead expansion sleeves set in ⅜-inch drilled holes in a concrete slab floor.

Mark the screen door to fit the opening and plane to fit if necessary. Mortise three 3½ x 3½-inch butt hinges into the edge of the door and frame as shown in Fig. 30. Nail door stop mold along both sides and across the top. Set the nails and putty after priming all wood parts. Finish with two coats of exterior paint. Set the door latch 36 inches above the floor level as shown in the instructions packed with the latch you buy. If you plan to convert your porch with storm sash inserts during winter, buy a combination screen and storm door. All-aluminum combination doors are also available with metal jambs that can be applied to your framed opening. Follow instructions packed with the aluminum doors when framing the opening. •

Installing Gutters and Downspouts

Aluminum gutters are first choice for permanence and economy—and a cinch to handle and install.

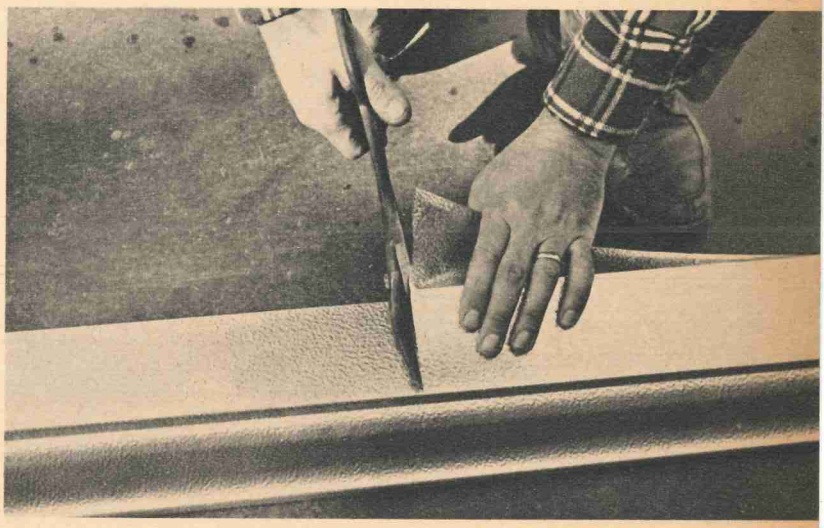
By David X. Manners

Photos by the author

GUTTERS are important for three reasons. 1. They prevent erosion caused by rainwater falling off roofs. 2. They protect anyone walking alongside buildings from the annoyance of being dripped upon. 3. They keep water out of basements.

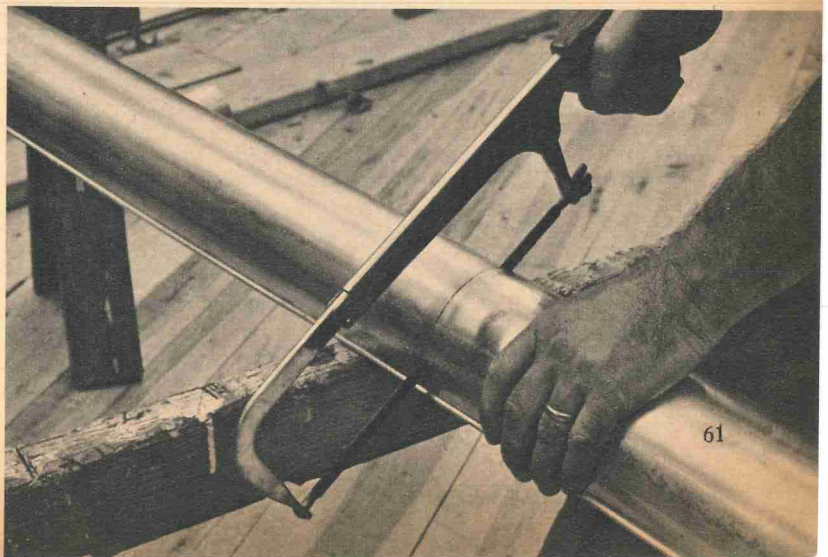
Aluminum gutters and downspouts are the easiest for the handyman to install. They're up to 50% lighter than other types, which makes them a cinch to handle and work with. Special aluminum slip connectors make joining of sections simple—you get a watertight connection without soldering. Most important, once your gutters and downspouts are installed, you can forget about them. They require no maintenance. Though you can paint them if you wish, they don't require it. Their natural smooth or embossed finish remains durable and attractive indefinitely.

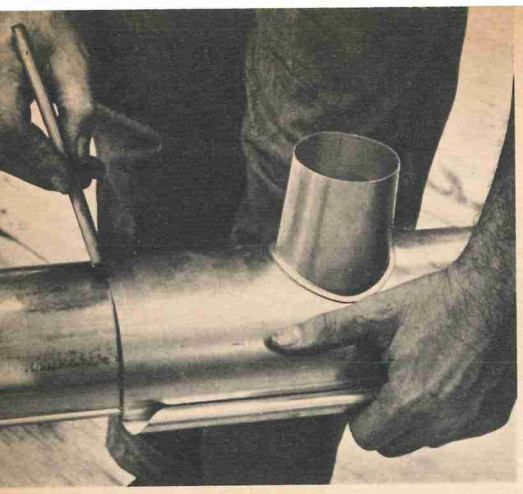
Aluminum gutters and downspouts will never rust out or



Cutting aluminum gutters and downspouts to size is quite easy; use tinsnips or a fine-toothed hacksaw.

Box gutter, above, is more rigid and attractive than half-round gutter, right, but carries off less water.

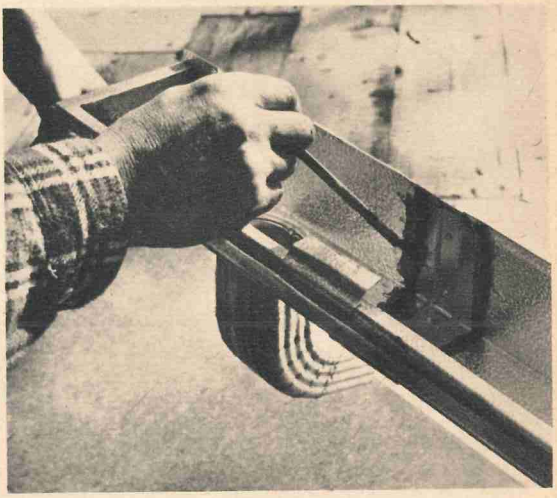




Use outlet section as a guide for marking gutter for cutting. Marking helps assure a square cut.

Fill the slots in the end cap with sealing mastic squeezed directly from special applicator tube.

Secure the connector by placing a block against it and tapping lightly with a mallet or hammer.



After the joint has been made, apply mastic to connector edges to assure a more permanent joint.

corrode. A thin coat of oxidation that forms after installation protects the aluminum from further weathering, which means you'll never be troubled by rust streaks or green corrosion stains on your siding, as you might be from other materials. Important, too, particularly in rural areas where run-off water goes into cisterns, is the fact that the oxide which forms on aluminum is non-toxic. Water drained through aluminum is always 100 per cent pure.

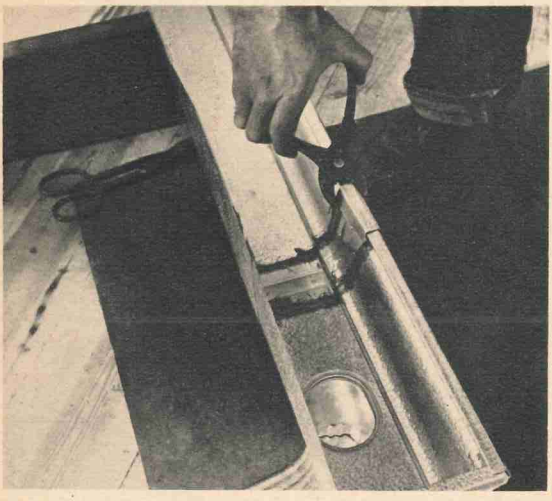
Aluminum gutters and downspouts come in two types: half-round and box (or Ogee), both available in either plain or embossed finishes. The half-round gutters carry more water than the comparable size of box gutter. The latter, on the other hand, is more rigid and is considered by some to be more formally attractive. Round downspouts come in plain or corrugated style, the corrugated being desirable where resistance to repeated freezing is a factor.

Here's how to figure what materials you'll need for your installation. Both gutters and downspouts come in 10-foot lengths. Thus if your roof line measures 38 feet, order 4 lengths of gutter (also called trough or eaves trough). Aluminum guttering is easily cut with hacksaw or tinsnips and any leftovers have many handy uses around home or shop. You'll need one slip connector for every length of gutter, plus one for each extra fitting, such as gutter outlet sections.

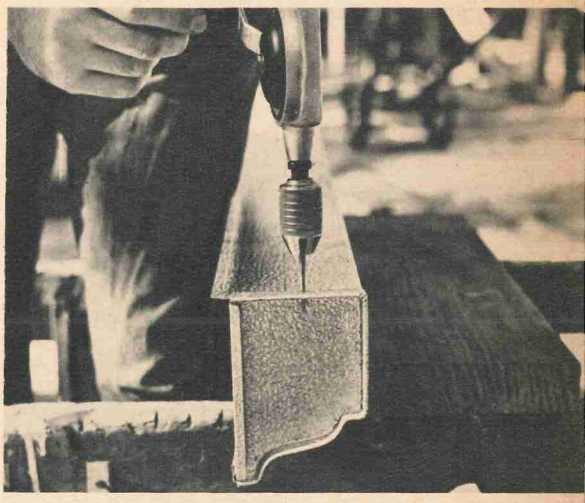
Figure on a minimum of one gutter outlet section and downspout (also called conductor pipe or leader) for every 700 square

Fit end cap to length of gutter, then apply additional mastic inside trough at joined edges.

Use a slip connector to join two lengths of gutter, or a length of gutter and an outlet section.



Use pliers to crimp the free end of the cemented slip connector to the leading edge of the gutter.



Slip connectors and end caps may be additionally secured to gutter by use of sheet metal screws.

feet of roof area if round downspout is to be used, and one for every 600 square feet if you use rectangular downspout. Three hanger straps are needed for every 10-foot length of gutter and two pipe bands per 10-foot length of downspout.

MATERIALS NEEDED

1 length of gutter for every 10 feet or fraction of roof drip-edge
2 pipe bands per length of downspout
corner and outlet
1 slip connector for each cut piece of gutter
3 hangers, or spikes and ferrules, per gutter length
2 pipe bands per length of downspout
2 ends for each complete gutter
2 elbows for each offset gutter-outlet-to-downspout connection
1 elbow, as a shoe, where downspout empties directly on ground
1 aluminum strainer at each gutter outlet section
1 inside mitre wherever gutter turns an inside corner
1 outside mitre wherever gutter turns an outside corner
½ pint of aluminum mastic will seal 6 connectors, 4 caps, 2 outlets—enough for the average job
aluminum (or stainless steel) nails and screws

If the new aluminum gutters are a replacement, after removing the old gutters and fittings, repair or replace the fascia boards (facing on roof edge) if necessary. Now is the time to give the fascia a good coat of paint.

Assemble your gutter on the ground to

correspond to your roof measurements. Locate sections with outlets at points where downspouts are to be placed. These are usually at ends or corners, or at centers of long runs. Downspouts are necessary to break long runs because gutters that are over 40 feet are likely to form pockets of standing water. Also, one end of an overlong gutter will be noticeably higher than the other, which may not be visually pleasing.

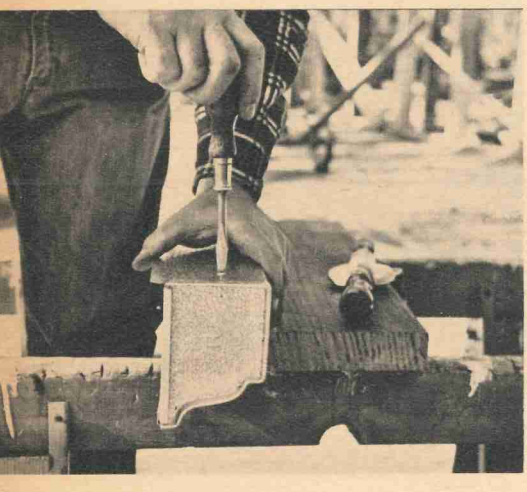
In test-assembling gutter on ground, make sure that sections go a full ¾ inch into slip connectors. In the case of half-round connectors, see that overlapping lip of connector faces in direction of water flow.

Connectors fit tightly, so it's important that you have them in good working order before you attempt making fittings on roof or ladder. Mastic will make the connectors slip on easier, but be sure of the fit before you apply mastic. It's messy to handle after it's on. Don't strike the edge of connector with a hammer in trying to fit it. Place a piece of wood over the connector and then tap only lightly.

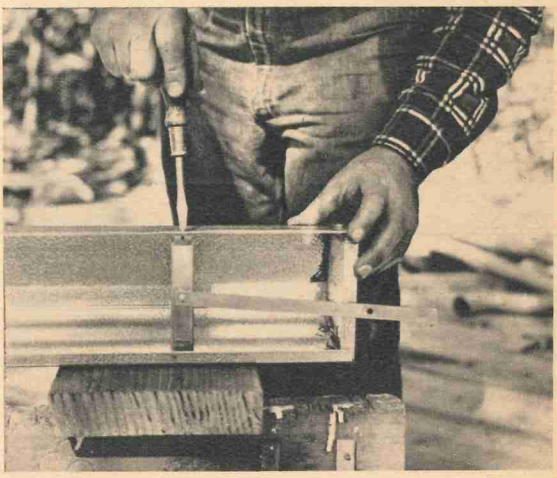
Mark the position of gutter placement on the fascia or its equivalent. The gutter must have a downward slope of 1 inch toward the outlet for each 16 feet of its length. Figuring the far end of the gutter will be at, or near, the top of the fascia, make a mark ½ inch lower every 8 feet as you move toward where the outlet will be. In any case, the gutter must be far enough below projecting shingles to prevent water from backing up under the shingles when gutter is full.

If roofing does not have a good drip edge,

If using sheet metal screws to secure connectors and end caps, first drill or punch starter holes.

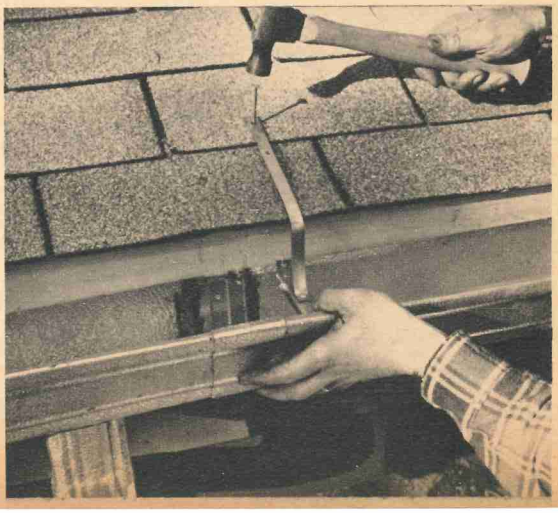


Ogee hanger is attached to rear of trough with a sheet metal screw, to front with a machine screw.



The outside edge of the trough should be below roof angle to protect trough from sliding snow.

Where possible, position supporting strap hangers so they come over roof rafters for nailing.



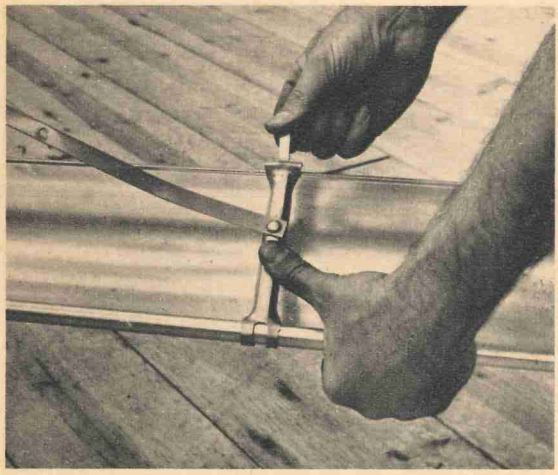
provide one by means of a 6-inch-wide strip of aluminum flashing. Apply 4 inches of flashing underneath the roofing, and allow 2 inches to extend over the edge of the roof down into the gutter. Nail it in place with aluminum nails. If you can't insert flashing underneath the roofing, as in the case of roll roofing, nail the flashing securely to the top of the roofing and apply a liberal coating of asphalt-asbestos roofing compound in a 2-inch strip along the flashing's upper edge: 1 inch on the flashing, 1 inch on the roof.

If gutters are to be attached with strap hangers, put the hangers in place now. Space them at approximate 30-inch intervals, locating them, if possible, so they will come over roof rafters for nailing. To attach the half-round hanger, fit its rigid crosspiece across top of the trough, then bend the thin strap around the under side of the trough from front to rear. Pass the end of the strap through the slot in the crosspiece and bend the strap-end back on itself. The hanger should fit snugly.

Ogee hanger is attached to back of trough with ⅜-inch sheet-metal screws (aluminum or stainless steel), and to front of trough with machine screw and nut. Predrill ⅛-inch-diameter holes before driving sheet-metal screw through back of trough into hole in hanger's crosspiece. Head of machine screw should be on outside of trough, nut on the inside.

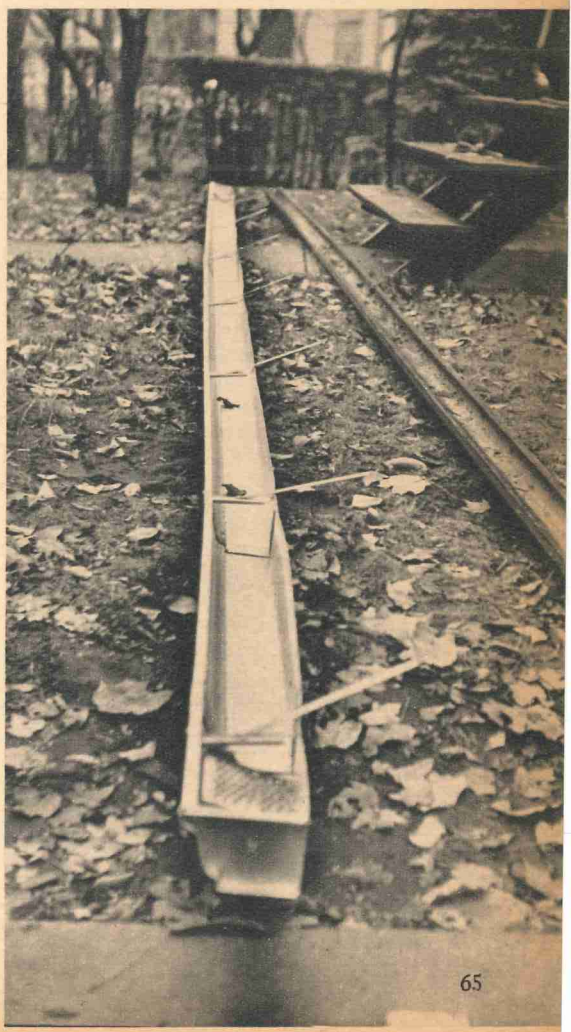
Alternately, stainless steel gutter spikes and aluminum ferrules may be used for attaching Ogee gutter. Using a wooden block as backing, drive the spike through the front of the gutter at its top edge. Put the spike through an aluminum ferrule

Half-round hanger has a thin strap that passes around underside of trough from front to rear.

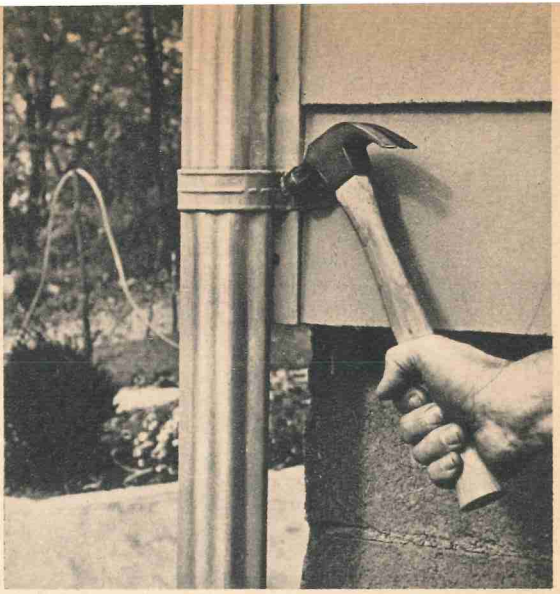


Ogee gutters may also be attached with stainless steel spikes driven through aluminum ferrules.

Test-assemble gutter, but do not attempt to put up more than a single length of trough at a time.



Aluminum strainer, pressure-fitted into place, keeps leaves and twigs from clogging downspout.



The downspout is held in place against the building by means of two pipe bands per 10-foot length.

placed across the gutter, and then drive the spike on through the back of the gutter. Spacing of the spikes is the same as for strap hangers. Where possible, space so they can be driven into rafter ends.

Now, apply aluminum mastic to the receptor slots of the end caps and slip connectors. The mastic can be applied directly from the tube container; the tube's pointed nozzle provides an effective means of getting the mastic exactly where you want it. When connector, or end cap, is in place, apply an additional sealer of mastic on the inside of the trough where the joining has been made.

In regions subject to severe snow or icing conditions, slip connectors and end caps may be further secured with two No. 8 sheet-metal screws, ⅜ inch long. Install one screw about ½ inch from the top at the front of the trough, and a second screw about ¾ inch from the top at the back of the trough. Predrill screw holes or pierce with a nail.

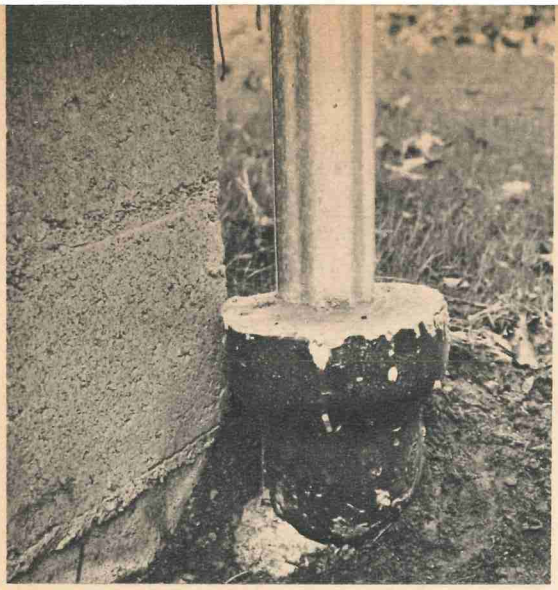
You are now ready to hang the first length of trough. All hangers are in place and all the preparatory work of fitting and drilling that it's possible to do on the ground will have been done. Hang the trough with outlet section and end cap in place at one end and slip connector in place at other. Alternately, have a corner mitre attached.

Do not attempt to put up more than a single length of trough, plus outlet or mitre section, at one time. Though aluminum is far lighter than other metals, a section ten or more feet long is unwieldy on a ladder. Preferably, have someone hold one end of the trough while you get the other into proper position. If help isn't available, you can contrive a support for the far end of the trough by temporarily nailing a wooden block to siding or fascia. Or tie a cord around the trough end and attach the cord to a nail partially driven into fascia, rafter end, or roof. If nail is put in roof, drive it in afterward and coat the spot with a dab of mastic.

Use two aluminum nails for each strap hanger and nail firmly to roof sheathing. Where possible, nail to roof rafters. Insert hanger straps under roofing where convenient. With first length of trough in place, attach other sections. When installation of trough is complete, apply coating of mastic to any joining edges on inside of trough that have not already been covered. Nail the back of the gutter to the fascia board between hangers. Press a perforated aluminum strainer into position over each outlet to prevent clogging of pipe by leaves, twigs and other debris.

To bring the downspout against the wall of the building, it is usually necessary to make the connection between outlet and downspout with a pair of elbows. Use 75-degree elbows where the offset is small. Use 60-degree elbows where the offset is six inches or more. Offsets of any size may be provided by installing a piece of conductor pipe of appropriate length between the two elbows.

The downspout is held in place by means of two pipe straps per 10-foot length. A rectangular downspout makes a neater fit against the building wall, but the round downspout allows freer air circulation.

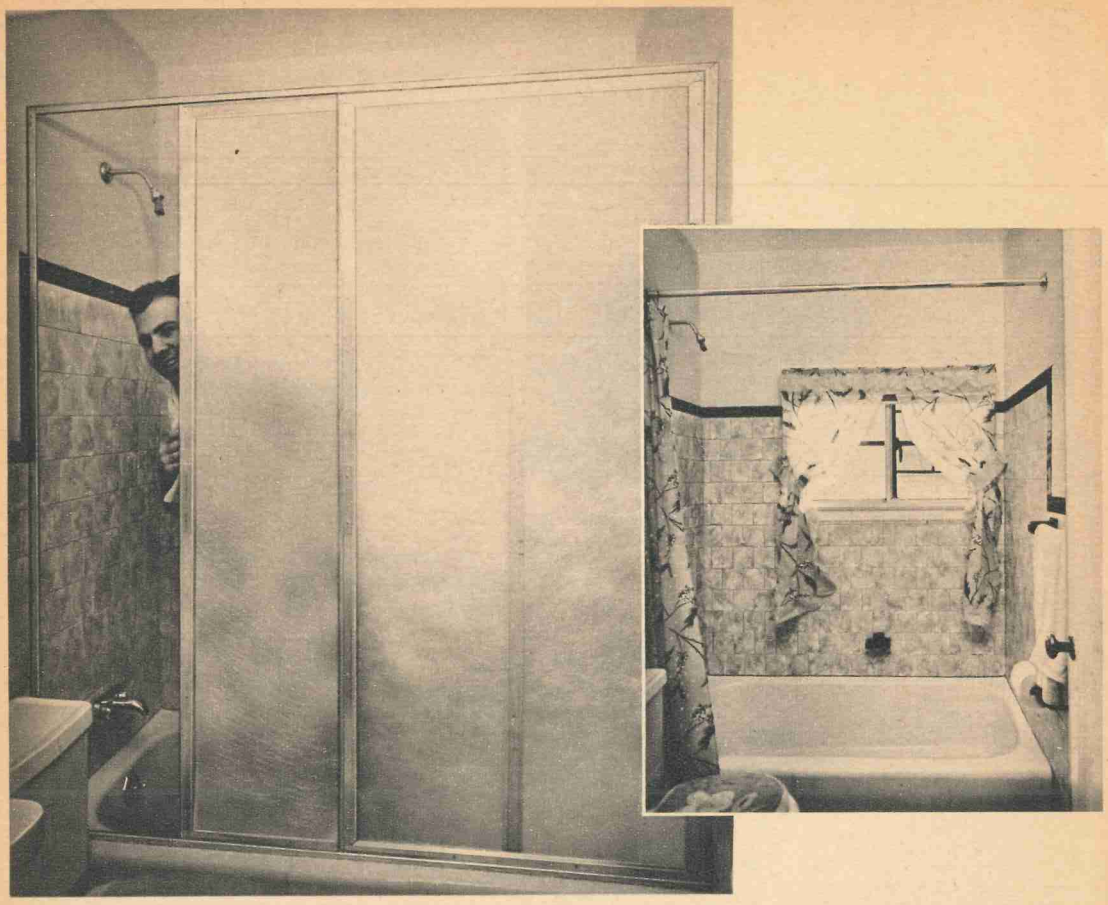


Tile may be used to conduct water away from the house, either to a dry well or storm sewer line.

Bend downspout bands to conform to shape of pipe and nail to a snug fit with 1¾-inch aluminum nails. An elbow may be used at the bottom of the downspout to direct water away from the foundation, or the downspout may be fitted into the hub end of ceramic drainage tile, or fiber tile. Tile may conduct the water either to a dry well 15 to 20 feet from the building, or connect to a storm or sanitary sewer line.

Where aluminum contacts masonry, or if contact with steel or copper is unavoidable, coat the contacting surfaces with aluminum-pigmented paint or mastic. Use only aluminum nails for strap hangers and pipe bands. Galvanized steel gutter spikes, however, may be used in place of stainless steel spikes. In this case, after installation, coat heads of these spikes with aluminum-pigmented paint or mastic. •

With downspouts properly placed you have little danger of cellar being flooded by run-off water.



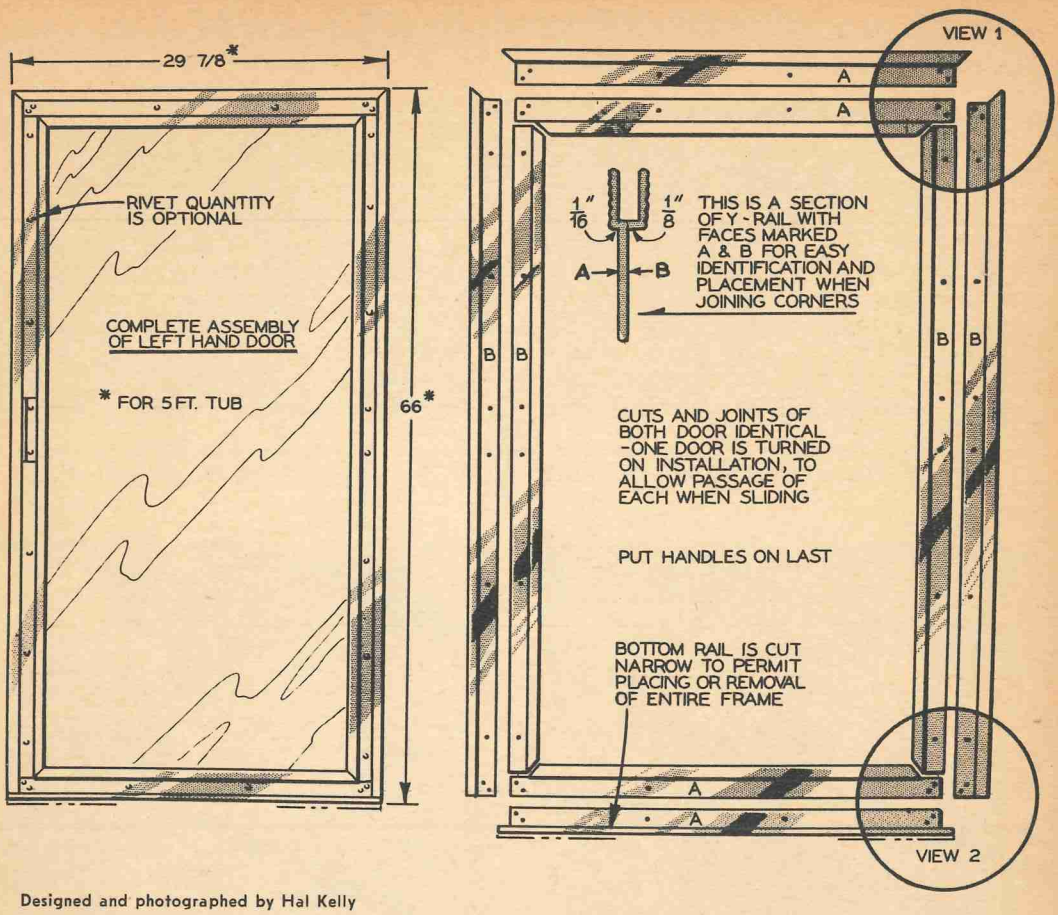
Tub Enclosure

ATTRACTIVE, smart and honestly functional, this bathtub enclosure will give your bathroom that up-to-date look. The basic materials used are aluminum angle and storm sash (or "Y" rails as they are called here). The two sliding door panels are of translucent plastic sheeting. The doors move at the touch of a finger and let in lots of light. It's easy to step in and out of the tub, too, because of the generous width of the doors.

You'll find the unit easy to make if you use the materials and follow the procedure suggested here. The length of your aluminum pieces will of course depend upon the size of your own bathroom and upon your own wishes. Plastic panels such as Resolite which can be worked with woodworking tools are available under several trade names. These panels come in many colors and will transmit up to 90% of the visible light. They can be purchased in either corrugated form or in flat sheets. The flat sheet of course is the proper one for this particular tub enclosure design.

TOP AND BOTTOM TRACKS

Start with your top and bottom tracks. After looking at the detail drawings shown here, cut these aluminum angles (⅛ x ¾ x ¾ inches) to the proper size on your table saw. Rivet the two angles together solidly.

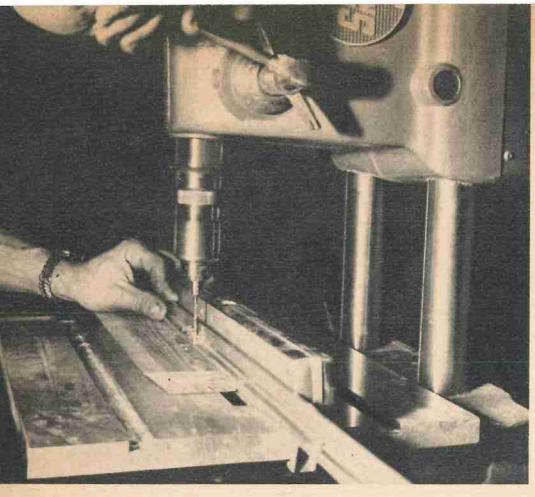


Designed and photographed by Hal Kelly

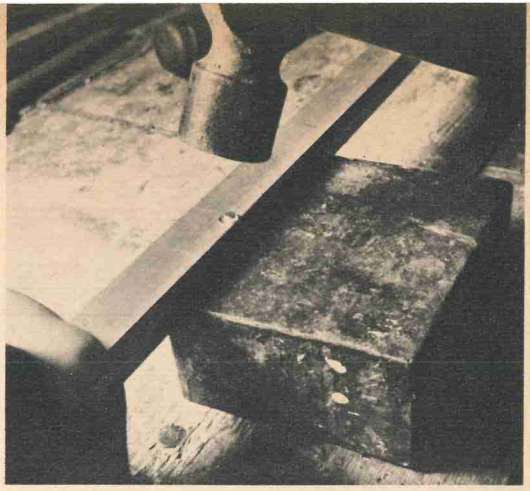
For water-tight bathing comfort, build yourself this bathtub enclosure. It's attractive, smart, and honestly functional.

Remember that the end of the rivet is peened into a countersunk hole so that the rivet is flush with the surface of the aluminum angle. This will enable you to cement the track to the tub edge. Drill your weep holes in the bottom track next. Then use your file, sandpaper, and steel wool on all rough or sharp edges.

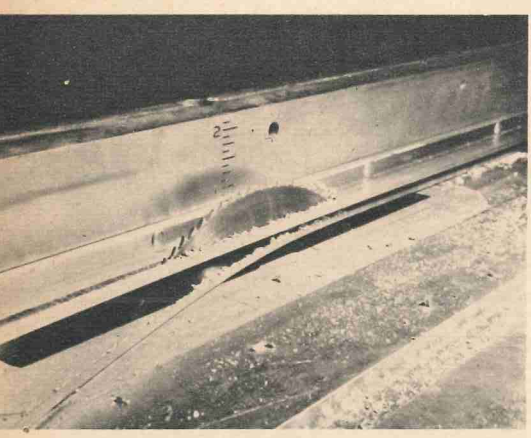
Cementing the bottom track to the tub is a simple job. Just use two lines of masking, Scotch, or some similar tape spaced ¾ inch apart along the edge of the tub. Cover the area between tapes with tile cement. Place the bottom rail in position with a little pressure so that the cement is pushed into the pores of both surfaces. Do not



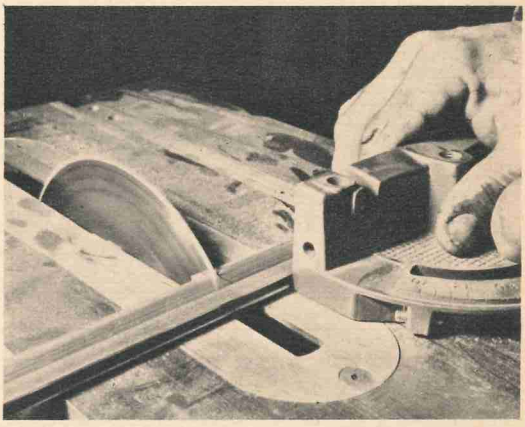
To make bottom tracks, fit two lengths of angle together as shown in drawings; join by riveting.



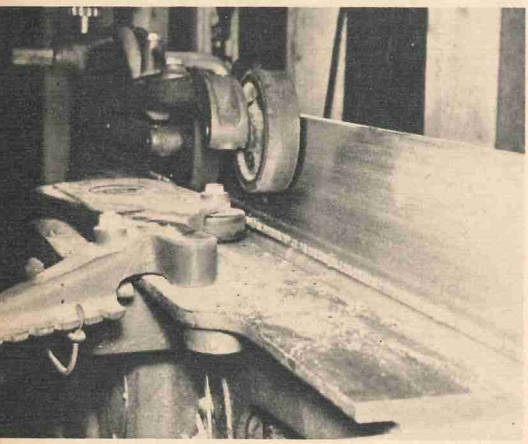
Drill holes for riveting; centerpunch, then add rivets as you go to keep tracks properly aligned.



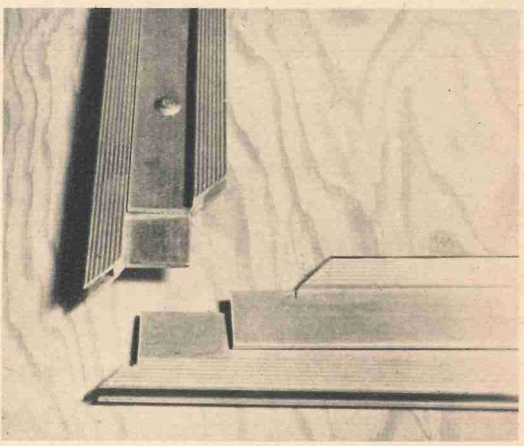
Top and tub side of tracks can be trimmed to the desired width on table saw after being riveted.



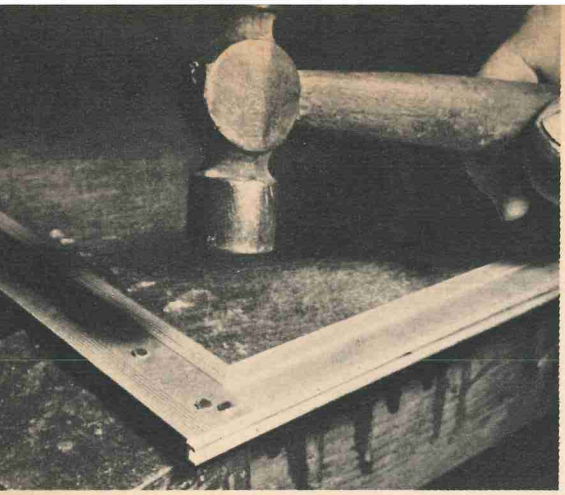
Saw your storm sash members or "Y" rails to correct over-all length with handsaw or table saw.



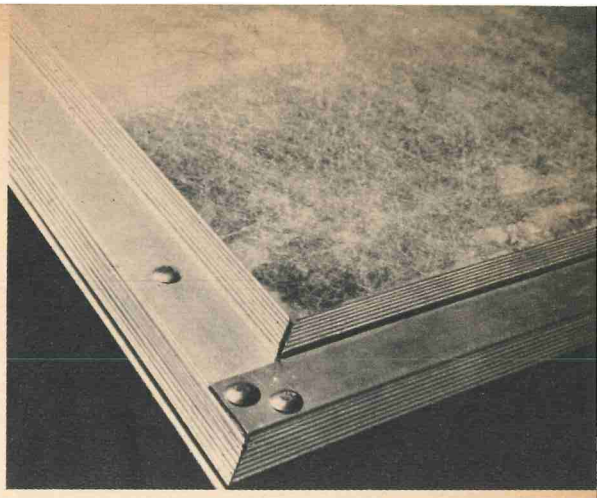
If you have a planer-jointer, run your tracks and "Y" rails through it to secure a true edge.



Cut miters as shown in detail drawing and join storm sash members to form sliding door frame.



Cut translucent plastic panel to required size; form frame around it and rivet corners to secure.



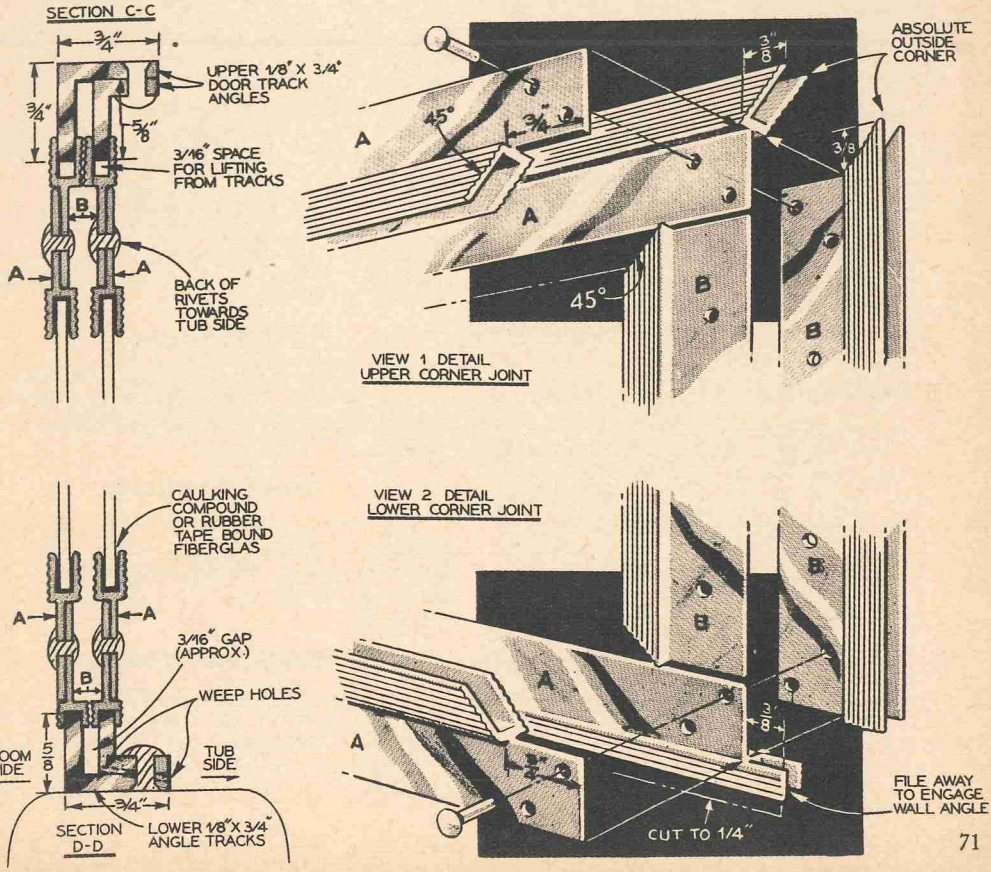
Upset rivets on inside of door frame, leaving clean, rounded rivet heads on outside of frame.

install the top rail until the doors are finished.

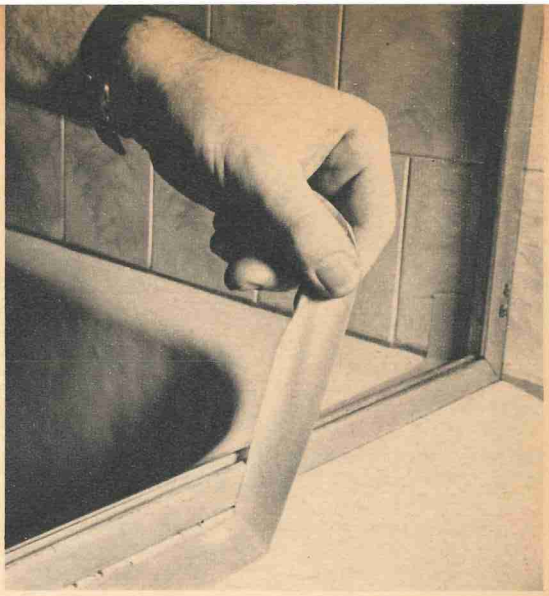
THE SLIDING DOOR

At this point a careful study of the detail drawings of the door corners will save you time, energy, and even money. Saw your storm sash or "Y" rails to the correct over-all length first. Note that the channel section of the "Y" rail which slides over the bottom track has been reduced to ¼ inch and that there is a $\frac{3}{16}$-inch space left between the top of the upper "Y" channel and the upper track. This will enable you to remove and install the doors whenever you wish by simply lifting the doors up and pulling them out at the bottom.

This bottom "Y" rail can be sawed to



To cement bottom tracks to tub edge, first apply tile cement between two strips of masking tape.



Place bottom tracks in position, seating firmly; let dry, then strip off tape with excess cement.

the correct width on a table saw and then sanded. It can also be run through a planer-jointer a few times (if such a machine is available to you) to secure a true or straight edge. If necessary, of course, a hand saw and a plane can be used similarly for this purpose.

Mark and saw your corner miters next. These corners can be sawed on a table saw or with a hacksaw. Once the corners are sawed and fitted together they can be marked for drilling.

The pair of rails lettered "A" in the drawing can be marked, centerpunched, drilled, and riveted together before the corner joints are drilled and riveted. The same procedure can be followed with the pair of rails marked "B" in the detail drawing. You can use a C-clamp or wood screw to hold the rails in position for drilling. Any vise will do the job, too.

RIVETING THE DOOR FRAMES

It's a good idea to buy rivets which are the correct length. Add to the thickness of the materials to be riveted together a distance equal to about two times the thickness of the rivet. This will give you, under any circumstances, the over-all length of the rivet to be used. If your aluminum rivets are too long you can easily cut them down with a pair of pliers or saw them shorter in a vise. A quick method of getting the right size rivet hole is to check the shank of your twist drill against the body of your rivet. They should be the same size.

Place your rivet in the hole with the rivet head on a solid steel surface. This can be the head of a hammer held in a vise, or a steel stake as shown here.

INSTALLING SIDE ANGLES

Measure these for length carefully. Remember that the top angle track must be $\frac{3}{16}$ inch above the bottom of the top "Y" channel (see section c-c of detail drawing). If your walls are of plastic tile just drill pilot holes through both the aluminum angle and the tile. Then insert self-tapping screws. You can secure a tighter bond with some tile cement applied to the aluminum angle also.

The aluminum corner braces ($\frac{1}{16}$ x $\frac{3}{8}$ x 2 inches) can be riveted or screwed into place with self-tapping screws; the protruding ends can be nipped off, filed, and sanded.

THE TOP TRACK

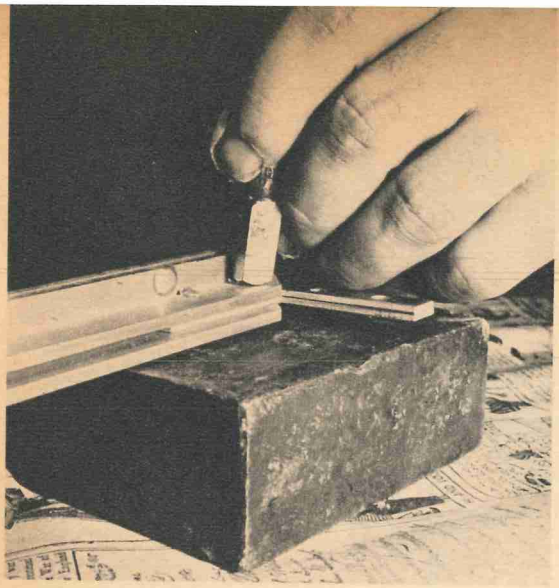
The top track is installed last. Mark and cut it carefully. Then mark the location of holes for the corner braces and fasten them into place.

DOOR HANDLES

Since the position of the door handles is important, mark their location with the doors in place. Then remove the doors, mark and drill, and rivet the handles to the doors.

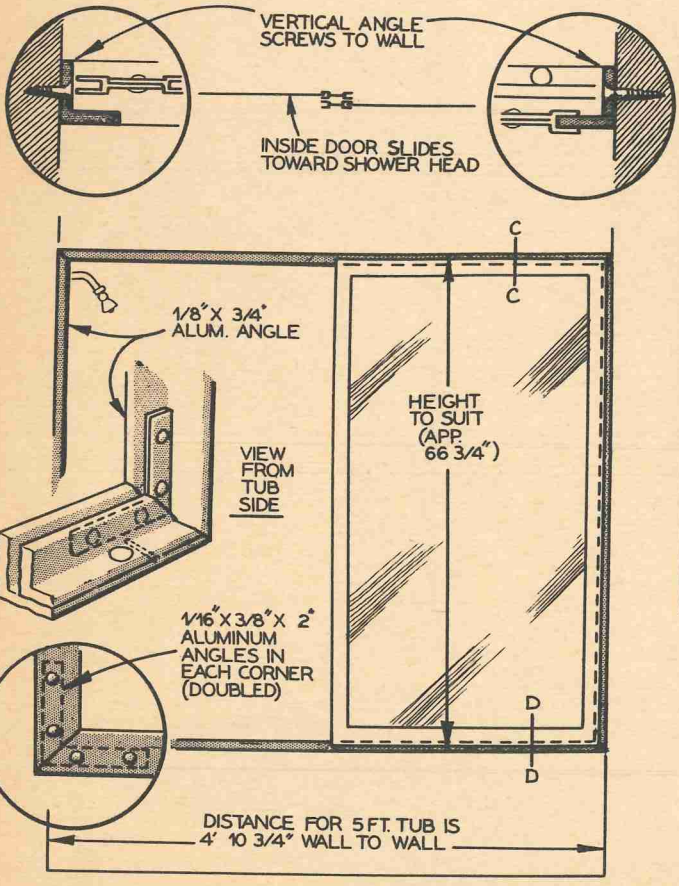
FINISHING NOTES

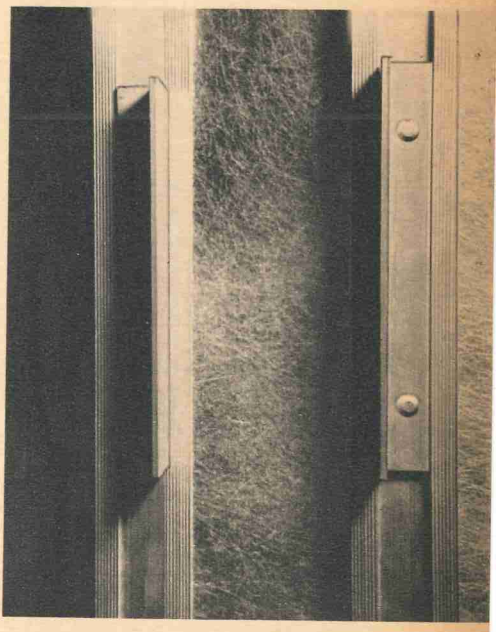
Use a file first on any edges which are rough or need to be rounded. Follow the filing with sandpaper and fine steel wool. Light rubbing with fine steel wool will leave a bright, uniform finish on the aluminum. •



Use head of a nail punch to get at rivets when securing angle inserts in corners of door frame.

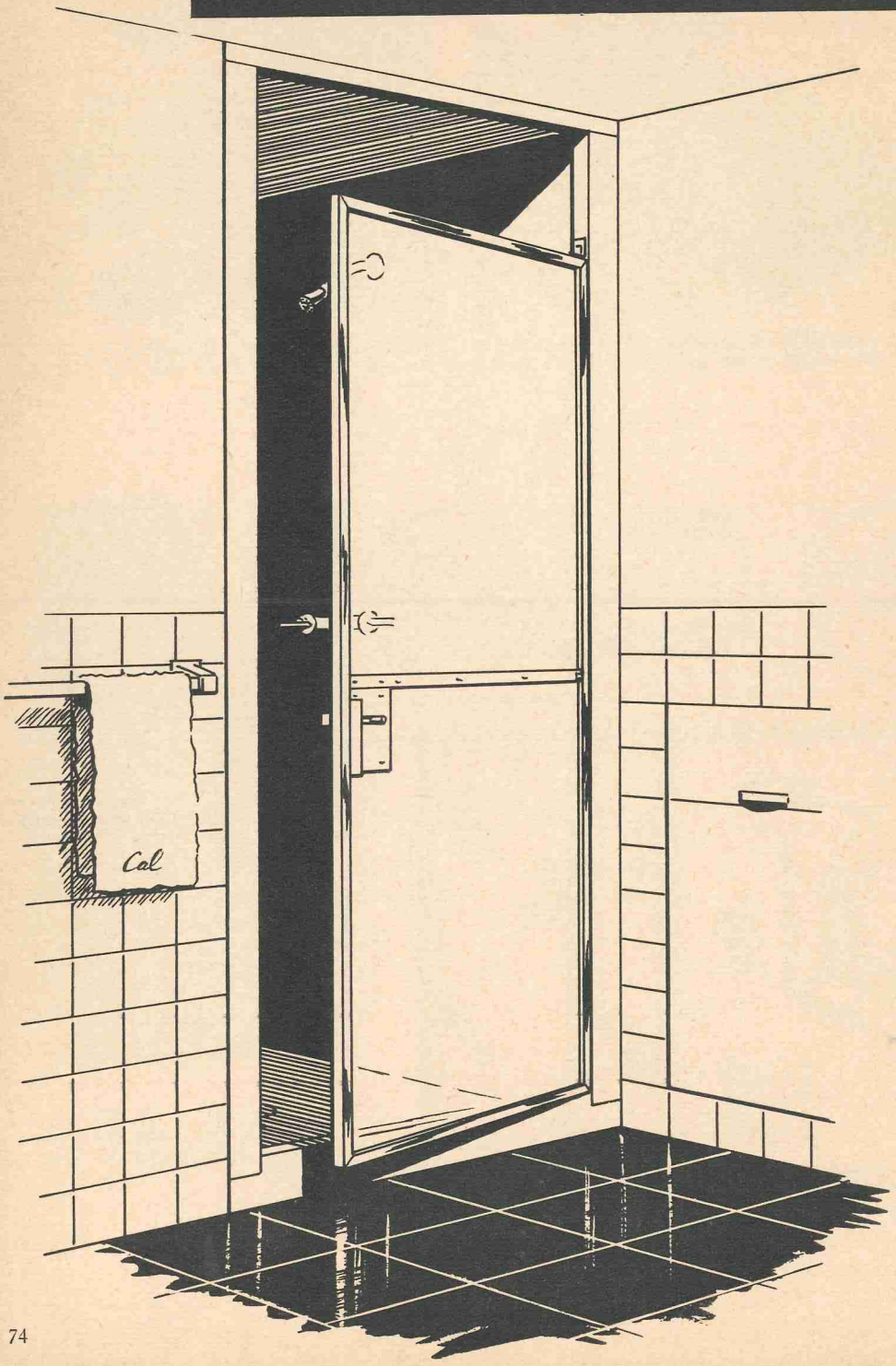
If the aluminum rivets you have are too long, you can easily cut them down with a pair of pliers.





Mark the positions of the door handles with the doors in place, then remove doors and attach handles by riveting.

Stall Shower Door



Here's a welcome improvement! A rustproof, mildew-proof stall shower door designed to replace that bothersome shower curtain.

HERE'S a welcome improvement for the shower stall or ready-built shower cabinet. It is designed to replace the bothersome shower curtain with rustproof, mildew-proof aluminum and Fiberglas.

Begin by determining size door needed. This will vary of course with your particular shower installation, so overall dimensions shown on the plan may not suit your needs; change as required. Be sure to leave enough space on sides for hinge and door-latch stop angles. Height of door should leave about 6-inch space at top for air and steam circulation. Bottom should be close to sill so that water will stay inside shower.

Begin construction by cutting screen extrusion to size for sides, top and bottom, with channel facing in. Miter corners 45° on circular saw or with miter box and hacksaw. The standard screen-frame corner locks require a bit of modification—the extra web of metal inside the corner angles should be cut or filed away as shown in the photo. Determine location of latch and stiffener strips and drill inside of frame for self-tapping screw attachment of front strip ends and door pull.

The Fiberglas panel is next cut to size. The edges should be covered with rubber tape for a tight seal where panel fits into channel in frame. Caulking compound may be substituted for tape if desired.

The frame is now assembled around the panel using the concealed corner angles.

The latch assembly comes next. This is hung on both sides of the panel and joined to stiffener strips running across door.

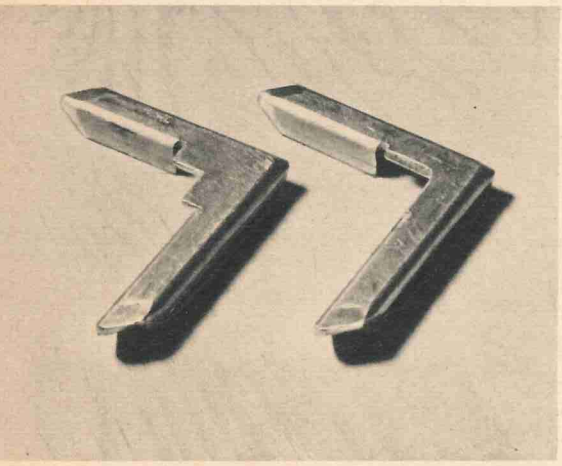
Make back plate first. This is slotted across center for rod handle. Make latch strip and join handle to it. Peen rod stock flush with latch. Next cut lengths of "Y" stock for latch slides. Also cut filler strips which go between slides and back plate. Now clamp slides and filler strips in place on back plate with latch in position. Space so that latch slides easily. Drill through slides, filler and back plate for rivets. It is a good idea to drill one hole, add rivet, then repeat for others so that holes are properly aligned.

The front plate is made to match back plate and handle slot. At this point it would be advisable to cut handle slot in Fiberglas panel before final assembly of latch. Use front plate for pattern.

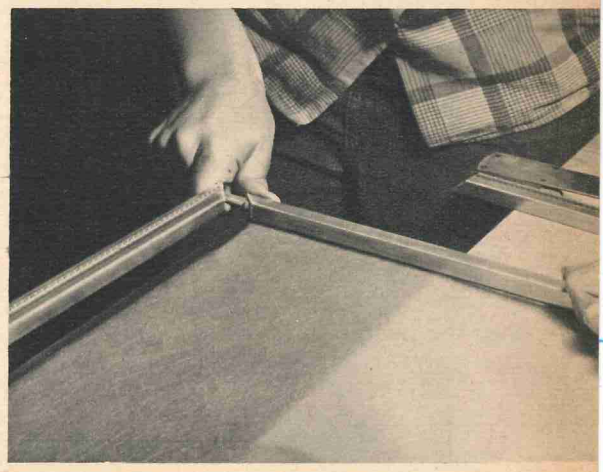
Make front and back stiffener strips now. Note that back strip also has filler strip to bring strip up level with back plate. Bend front strip to fit inside frame edges. Back strip lays flat across frame sides.

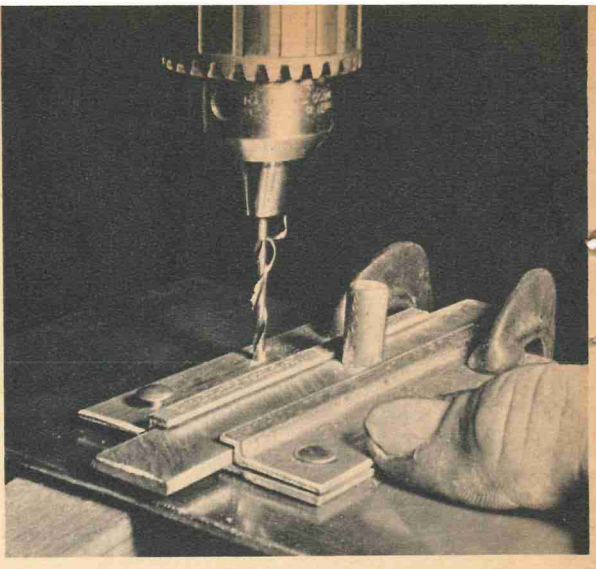
Assemble all latch and strip parts on

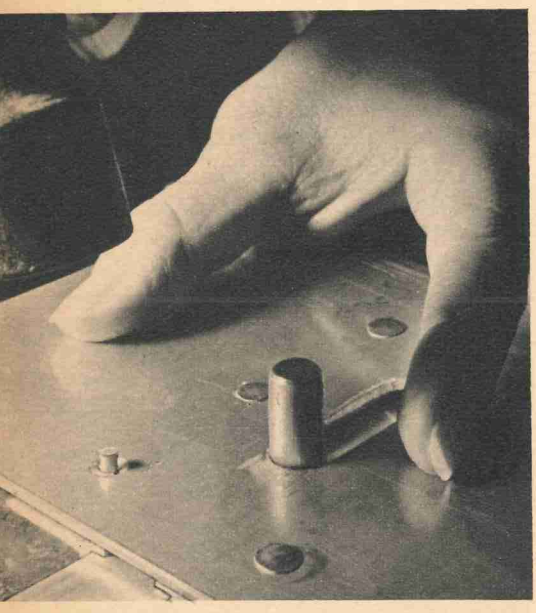
The extra lip on the inside of each corner lock will have to be cut out to adapt for the project.



Assemble mitered frame members around Fiberglas door panel, securing with concealed corner locks.







Begin latch assembly by clamping sliding handle and slides in place against slotted back plate.

Drill holes for rivets through latch-strip slide, filler bars and back plate, then rivet together.

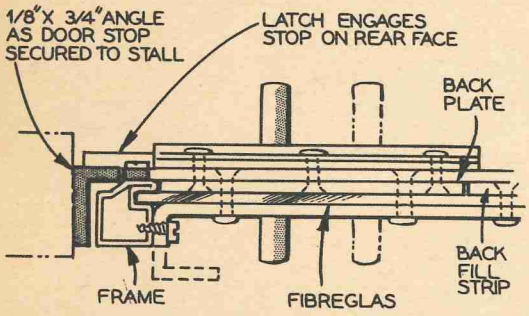
Drill one hole at a time, add rivet, then repeat process so that all holes are properly aligned.

Attach latch unit to shower door. Latch strips should be spaced so that latch slides smoothly.

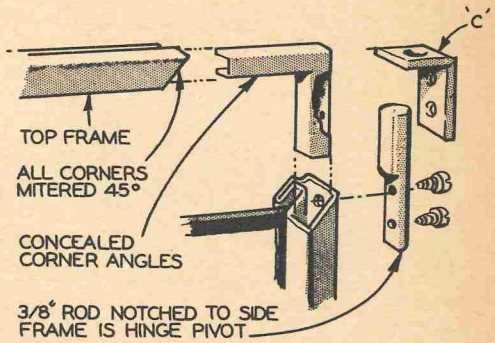
Add a short length of ⅜-inch rod at top and bottom of back side of door for hinge pivots.

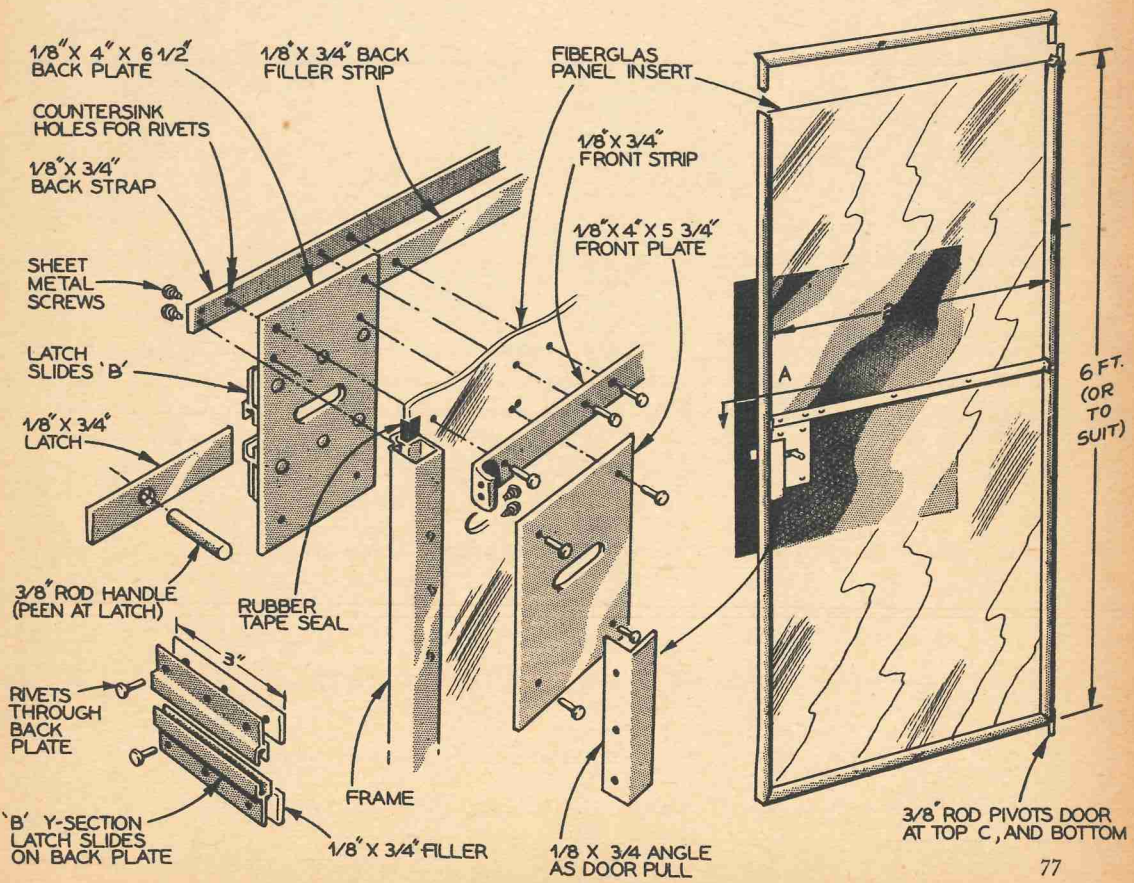
panel; clamp and drill for rivets. Any length rivet may be used since they can easily be cut to suit thickness of metal layers. It is best to get rivets slightly longer than necessary and cut down as needed.

Add ¾-inch angle for door pull at front plate. Short lengths of ⅜-inch rod are shown for hinge pivots at top and bottom. These mate with short section of angle which serves as pivot holder. The pivot holder is attached to stall sides with metal or masonry screws according to construction of your particular shower stall. A length of angle fastened to stall side serves as door stop; locate so latch engages rear face. •



VIEW A SHOWING SECTION AT LATCH





Lawn Furniture

By Cal Smith

This set of attractive aluminum and redwood furniture is ideally suited to outdoor living; it's rugged and wonderfully weatherproof.

The frames of the chair are made of Do-It-Yourself angle; rod bracing on underside of chair adds to rigidity.

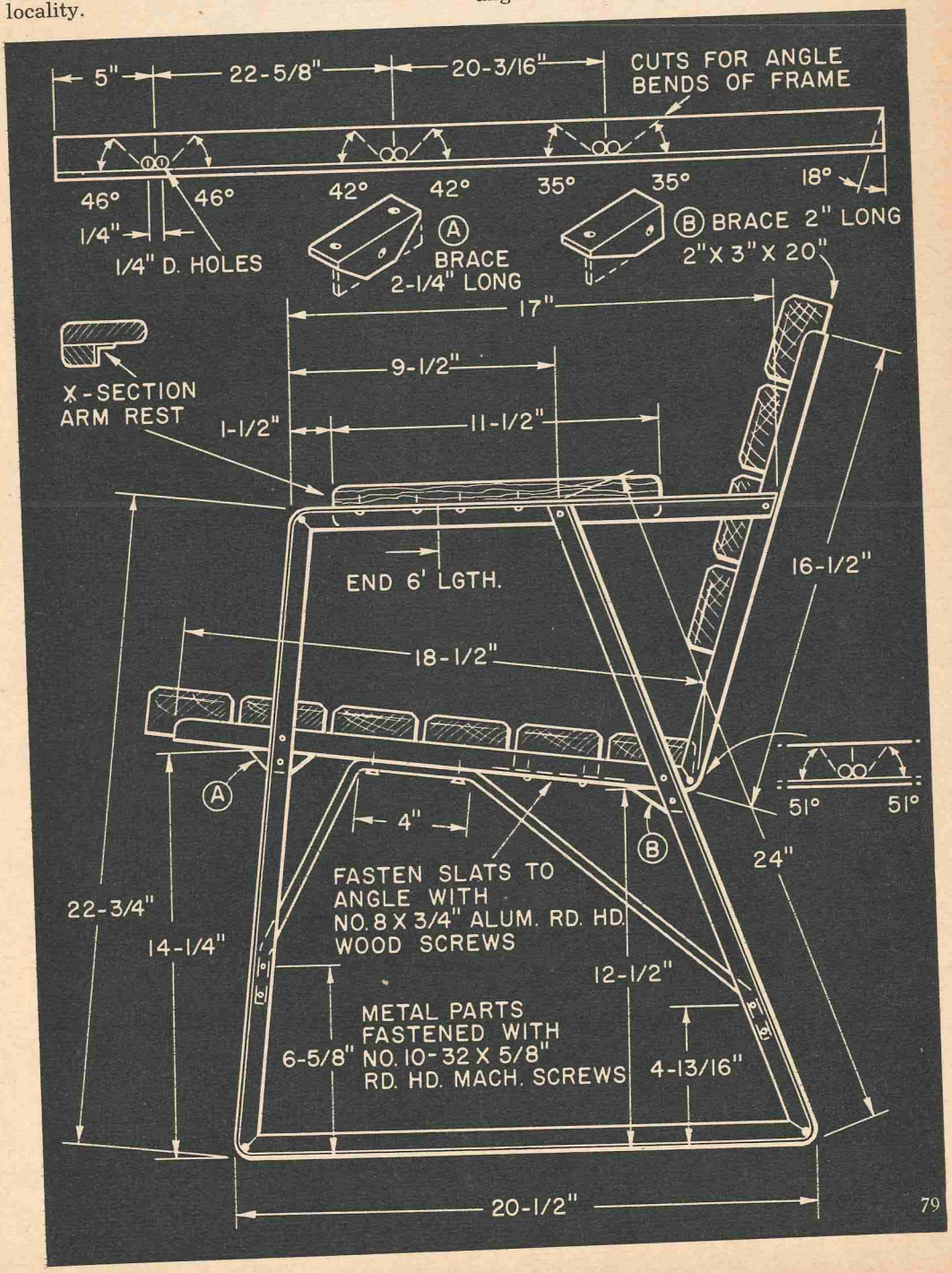
THE very attractive combination of dark wood and aluminum is typified in this lawn furniture set.

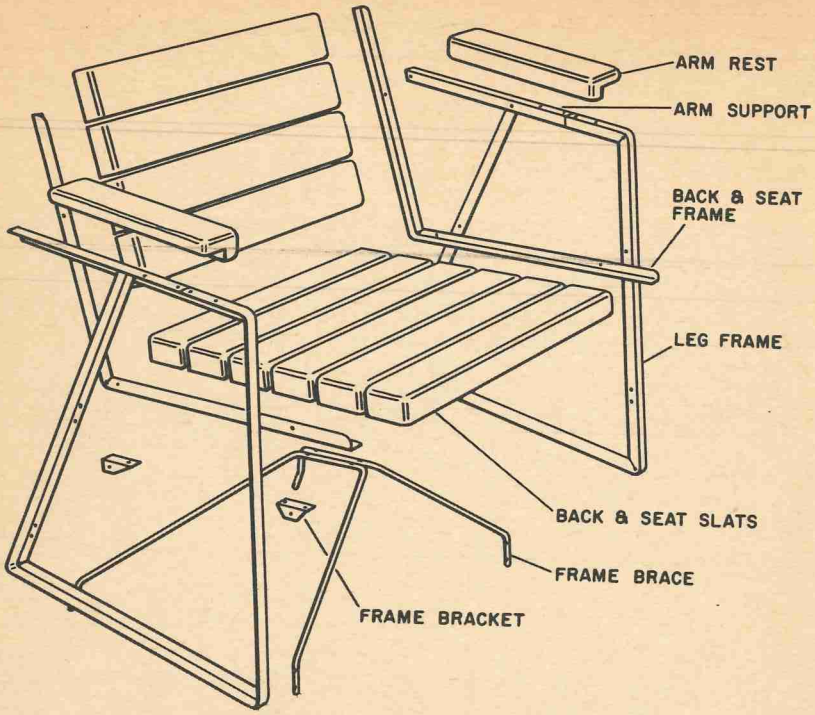
The design is both rugged and weather-proof, and requires a minimum of finishing. Although redwood is most desirable for seat and back, it is possible to use cedar or red cypress. Use whichever wood is most readily obtainable in your particular locality.

LAWN CHAIR

The frames of the chair are made of ¾ x ¾ x ⅛-inch angle braced with ⅜-inch (diameter) rod on underside for rigidity.

Begin construction by cutting pieces of angle for back and seat frame and arm support. (Make left and right hand pieces.) The leg frame is a full six-foot length of angle. Cut short braces marked A and B





on plan—two each are required. Drill $\frac{3}{16}$-inch (diameter) holes for wood screws in back and seat-frame piece. These should be spaced 2 inches apart at each slat. Next drill $\frac{7}{32}$-inch (diameter) holes in seat and leg-frame pieces for assembly bolts. Braces A and B are also drilled for bolts.

Now mark leg-frame angle for bending corners. The detail across the top of the plan shows the spacing and angles for these bends. Two ¼-inch holes are drilled and stock cleaned out between with a file. Next the angle cuts are made on the bandsaw or with a hacksaw. Frame can now be bent to shape. Hold angle stock flat on workbench when doing this to prevent twisting. The seat and back-frame angle is cut and bent in same manner as leg frame. Ends of back and seat frame are rounded off on disc sander, or filed smooth. Assemble leg, back, and seat frames with No. 10-32 x ⅝-inch bolts.

Redwood pieces for slats are next cut to 20-inch length. Bevel exposed edges. Coat slats on all sides with wood preservative. Use natural exterior wood finish to seal wood. One coat will give a dull finish, two coats will give a gloss finish. If high gloss is desired use spar varnish. When dry the slats can be assembled to back and seat frame with No. 8 x ¾-inch wood screws. Drill ⅛-inch (diameter) pilot holes in wood for screws.

The arm rest serves a dual purpose, as a rest and as a joiner for aluminum-angle support member. A piece of slat stock can be cut out as shown in cross section or assembled from two pieces of ¾-inch thick stock. The top of rest is 3 inches wide and lower piece is 1⅛ inch wide. Wood pieces can be joined with No. 8 x 1¼-inch flat-head wood screws. The arm rest is fastened to angle with four No. 8 x ¾-inch wood screws.

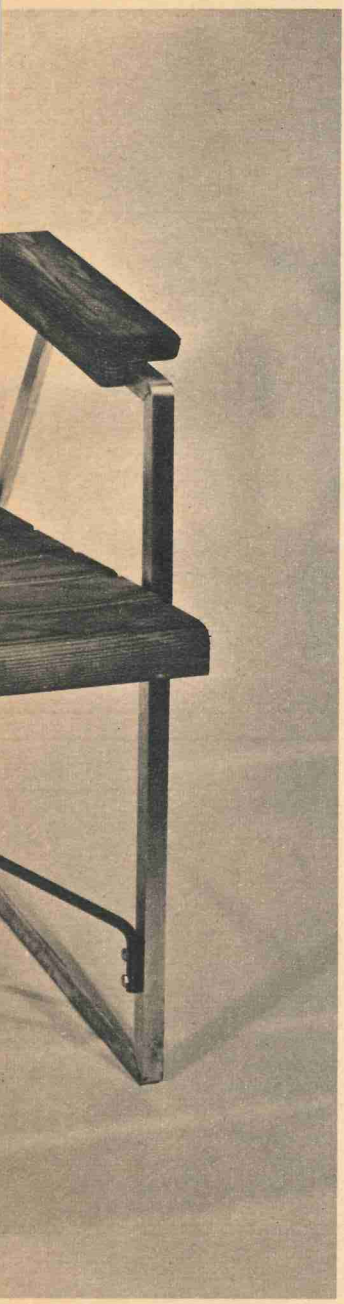
The ⅜-inch (diameter) aluminum rod underseat bracing is added next. Measure length and approximate bend positions with a length of string. Bend rod to shape and check fit before drilling holes. Fasten in place to side frames with No. 10-32 x ⅝-inch bolts. Use wood screws in underside of slats.

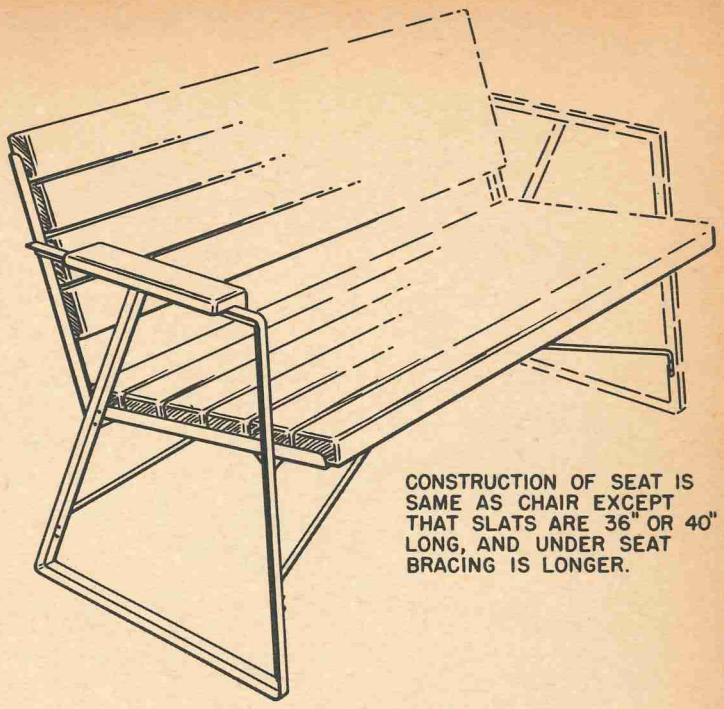
Rub down exposed aluminum surfaces with steel wool for burnished effect.

If wood specified is not available or is too costly, ¾-inch or 1-inch thick pine, fir, or oak may be substituted. For exterior use these other woods are best painted with good quality enamel for protection from the weather.

Bottom view of lawn chair shows details of under-seat bracing and attachment of slats to seat frame.

Construction of lawn seat is identical to construction of chair, except that slats and under-seat bracing are somewhat longer. The length of the seat is flexible, to be determined by your own requirements.



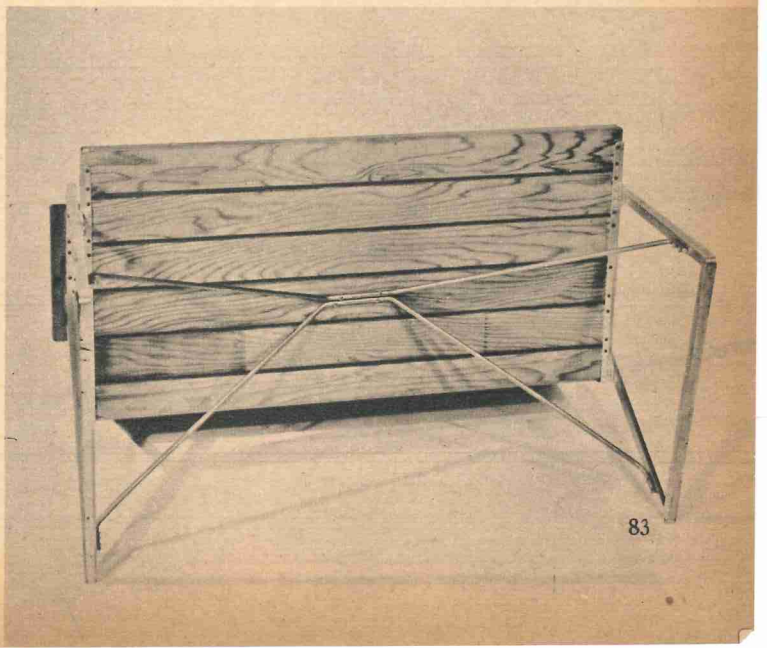


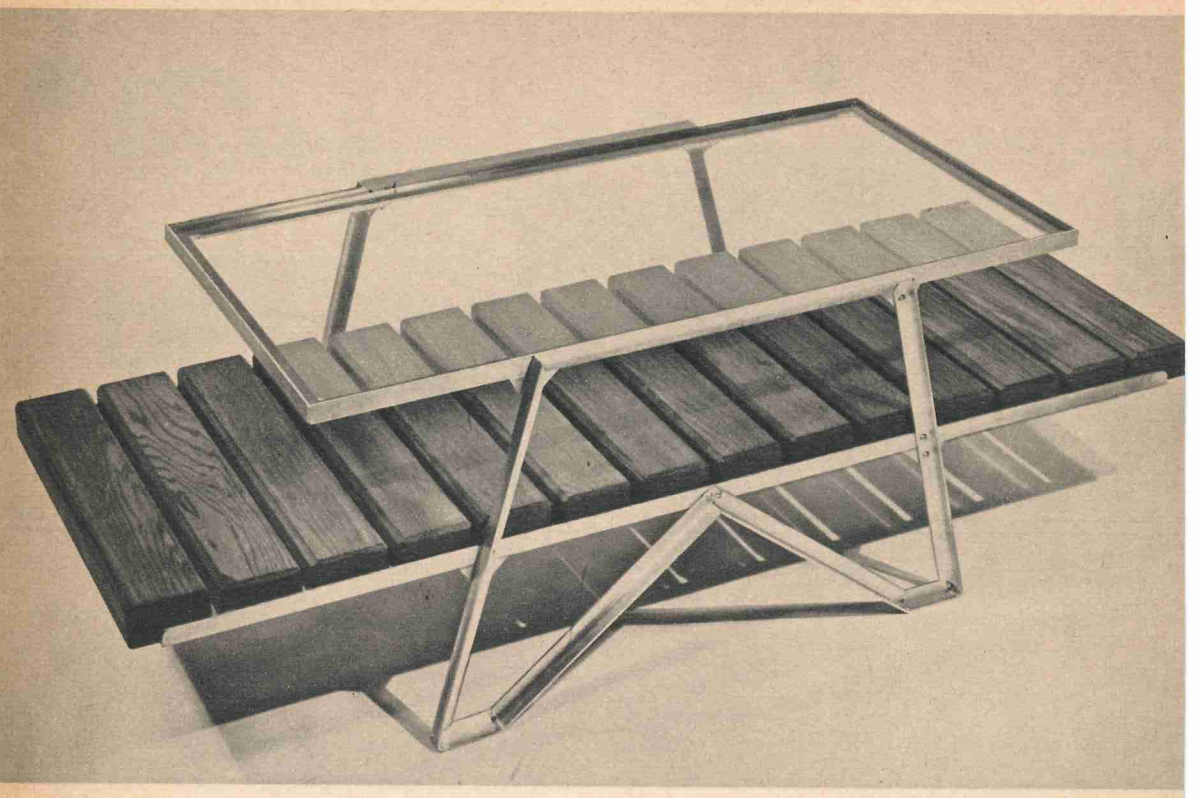
CONSTRUCTION OF SEAT IS SAME AS CHAIR EXCEPT THAT SLATS ARE 36" OR 40" LONG, AND UNDER SEAT BRACING IS LONGER.

LAWN SEAT

This lawn seat follows the same design as used in the chair, except that seat and back slats are lengthened. The self-bracing ⅜-inch rod members underneath are also longer.

Follow the instructions given for building the chair to assemble this handsome piece. Slats can be 36 inches or 40 inches long.





The side frames of this handsome, glass-top cocktail table employ an exceptionally sturdy design.

Corner braces in table-top frame and at other points of stress provide both sturdiness and safety.

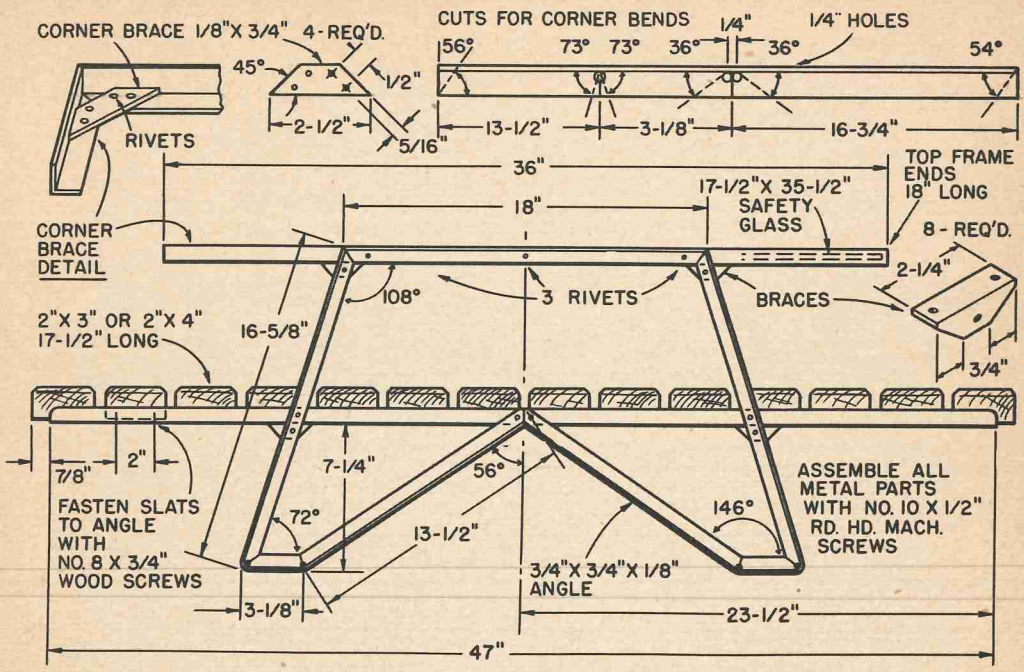
COCKTAIL TABLE

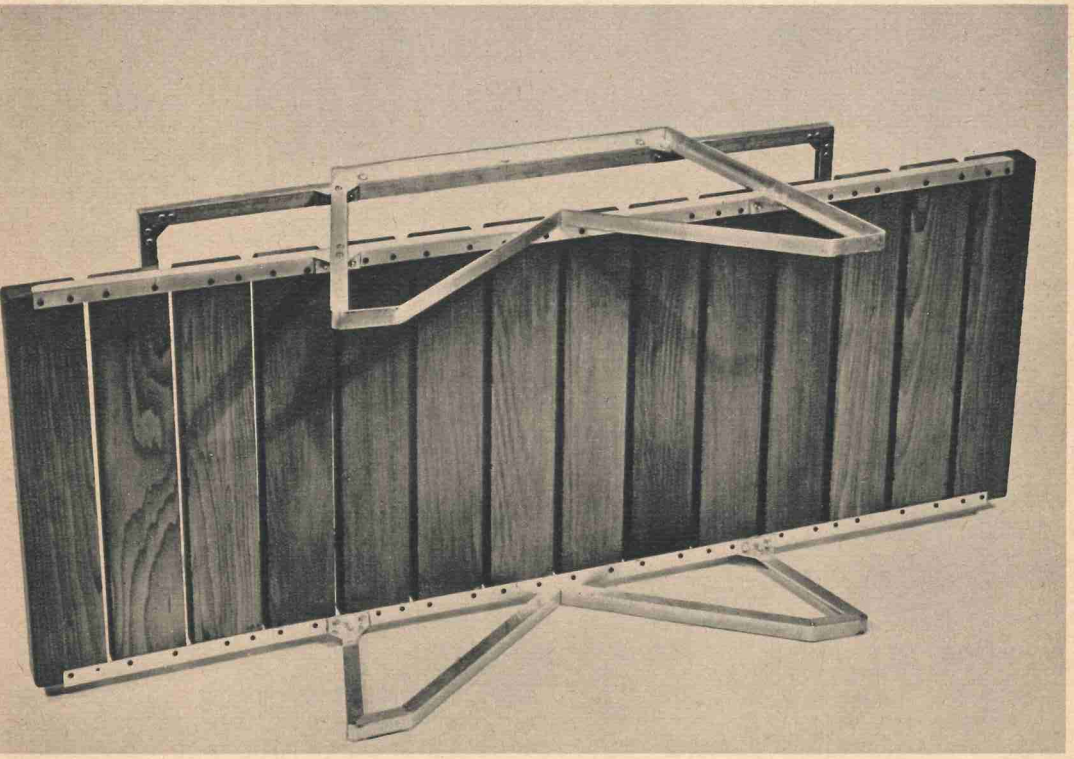
This handsome companion piece to the other outdoor or porch furniture in this set utilizes same aluminum and redwood design with a glass top.

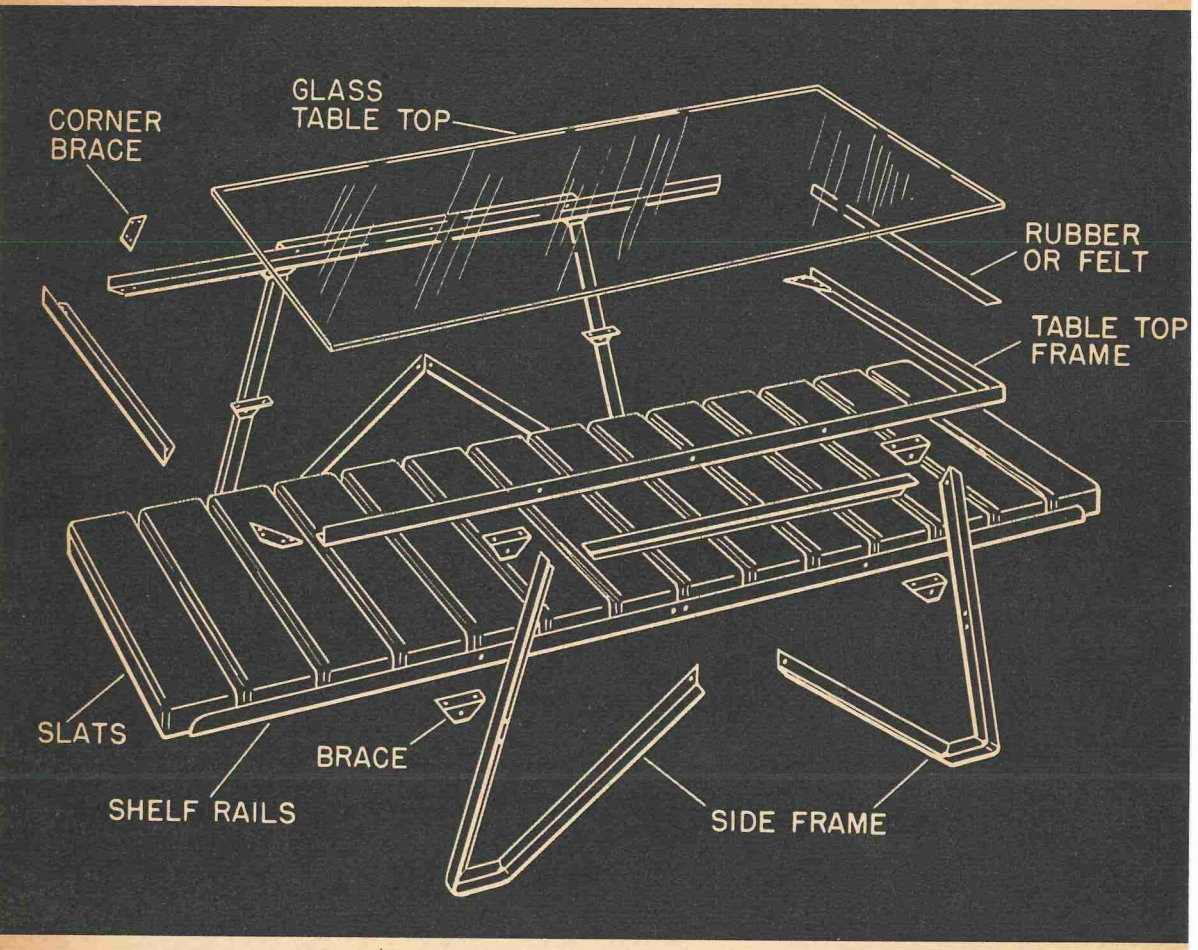
If there are children in the family and as a general safety precaution, always use safety glass for this or any other glass-topped table.

Construction follows the same pattern as the other pieces. The table-top frame is made as a separate unit and attached to side frames. Begin by cutting pieces of angle stock for table-top frame, side frames and lower-shelf side rails. Make right and left hand side pieces. Cut eight short braces (shown at right side of plan). Drill $\frac{3}{16}$-inch (diameter) holes in shelf rails for wood-screw attachment of slats. Holes should be spaced 2 inches apart at each slot. Holes for bolting rails to side frames should be drilled later after frames are formed. Drill three $\frac{7}{32}$-inch (diameter) holes in each short brace piece as shown on plan.

Make the table-top frame next. Cut and drill four corner braces according to detail on plan. Miter corners of frame pieces and lay out in position on workbench or floor. Square up with carpenter's square. Put corner braces in place and mark frame for drilling for rivets. Do not swap braces around since each brace should match a separate frame corner. Now drill frame pieces, then assemble braces to frame. The top pieces of side frames lay flush along table-top frame, and these pieces should have ends cut to 54° angle. The table-top frame and side pieces are joined with three rivets on each side. Four short braces are


CORNER BRACE 1/8"X 3/4" 4-REQ'D.
45°
1/2"
2-1/2"
5/16"
RIVETS
CORNER BRACE DETAIL
CUTS FOR CORNER BENDS
1/4"
1/4" HOLES
56°
73°
73°
36°
36°
54°
13-1/2"
3-1/8"
16-3/4"
36"
18"
17-1/2"X 35-1/2" SAFETY GLASS
TOP FRAME ENDS 18" LONG
8 - REQ'D.
2-1/4"
3/4"
108°
3 RIVETS
BRACES
2"X 3" OR 2"X 4" 17-1/2" LONG
16-5/8"
7/8"
2"
7-1/4"
56°
72°
13-1/2"
146°
3/4"X 3/4"X 1/8" ANGLE
3-1/8"
23-1/2"
47"
ASSEMBLE ALL METAL PARTS WITH NO. 10 X 1/2" RD. HD. MACH. SCREWS
FASTEN SLATS TO ANGLE WITH NO. 8 X 3/4" WOOD SCREWS





next added to table-top frame on underside. Drill $\frac{7}{32}$-inch holes in top frame to match holes in brace pieces. Bolt together with No. 10-32 x ½-inch bolts.

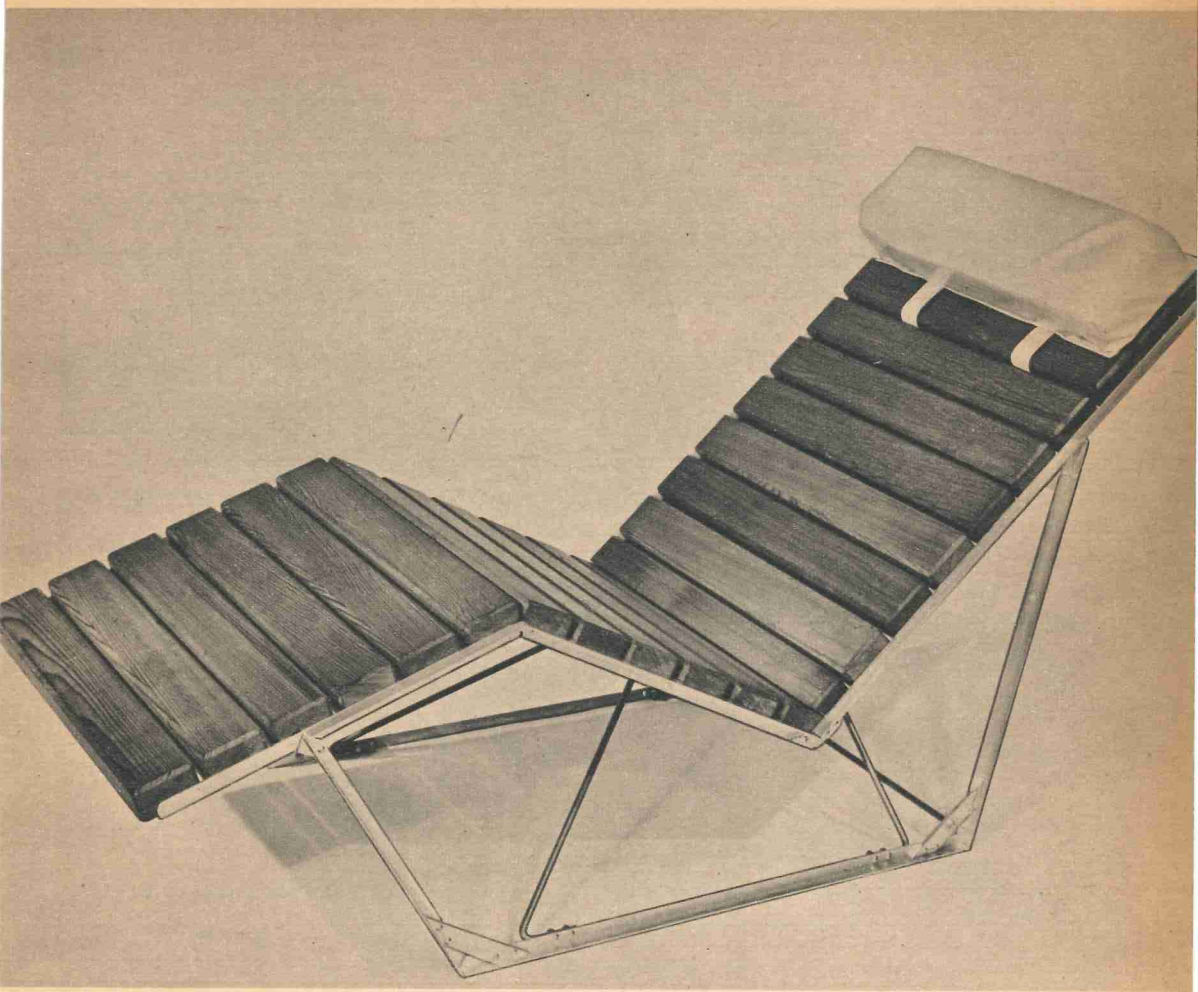
Side frames come next. The detail across the top of plan shows the spacing and angles for making the corner bends. The shallow angle bends require only one ¼-inch hole, while sharper angles require two holes. Drill holes as shown and clean out stock with a file. Make the angle cuts with bandsaw or hacksaw. Remember to make opposite pieces. Bend pieces to shape; hold flat on bench to prevent twisting. Side-frame pieces can now be drilled for assembly to top and lower-shelf rails. Bolt short braces to side frame, then bolt shelf rails to side frames. Check fit of side frame ends with table-top sides.

Wood pieces for slats are cut to 17½-inch length. Bevel exposed edges. Coat slats on all sides with natural exterior wood finish or spar varnish as desired. When dry the slats can be assembled to shelf rails with No. 8 x ¾-inch wood screws. Drill ⅛-inch (diameter) pilot holes in wood for screws. Slats are spaced ½ inch apart on rails.

With slats in place, table top can be bolted in place to complete assembly.

The glass table top should not be laid directly on metal frame. Lay a strip of ⅝-inch wide rubber or felt along inside of angle. Notch as required to fit over bolt heads. Rubber or felt can be fastened down with metal-rubber cement to prevent it shifting around.

Burnish exposed aluminum surfaces with steel wool as final finishing touch. Rub in one direction only for best results.



The chaise utilizes the "relaxer" system to take the weight of your body off the end of your spine.

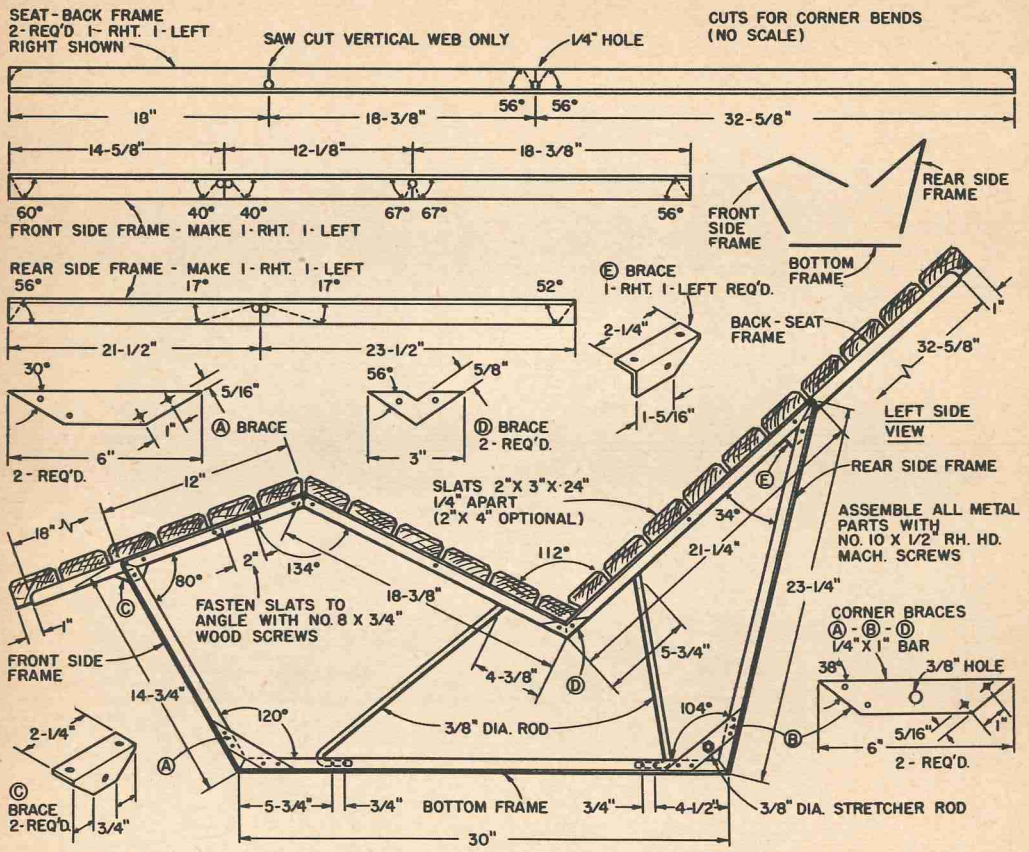
CHAISE LONGUE

The chaise completes the furniture set, and carries through the same design idea. It utilizes the "relaxer" system to take the weight of your body off the end of your spine. Actually you are more nearly lying down than sitting up in this unit.

Begin construction by cutting pieces of angle stock for back-seat frame and side frames. Note that side frames consist of three pieces: front, rear and bottom. Cut out short braces C and E from angle stock. Braces A, B, and D are of flat stock. Make right- and left-hand pieces of the parts as required. Drill all brace pieces as shown, $\frac{7}{32}$-inch holes, except piece B which has a $\frac{3}{8}$-inch hole in center for a stretcher rod. Side-frame pieces may be drilled now, but it is best to fit flat corner braces with side frames bent to shape.

Side-frame details for bending corners are shown across the top of the plan. Drill $\frac{1}{4}$-inch holes as shown and clean out stock. Make angle cuts with bandsaw or hacksaw. Bend pieces, holding flat on workbench.

With side-frame pieces bent to shape, flat corner braces can now be fitted. Lay out frame pieces in position; clamp if convenient. Put corner braces in position and spot holes in angle parts for assembly bolts. Drill $\frac{7}{32}$-inch holes in side-frame pieces and



assemble. Bolt D brace temporarily since seat-back frame will be fastened with same bolts when made.

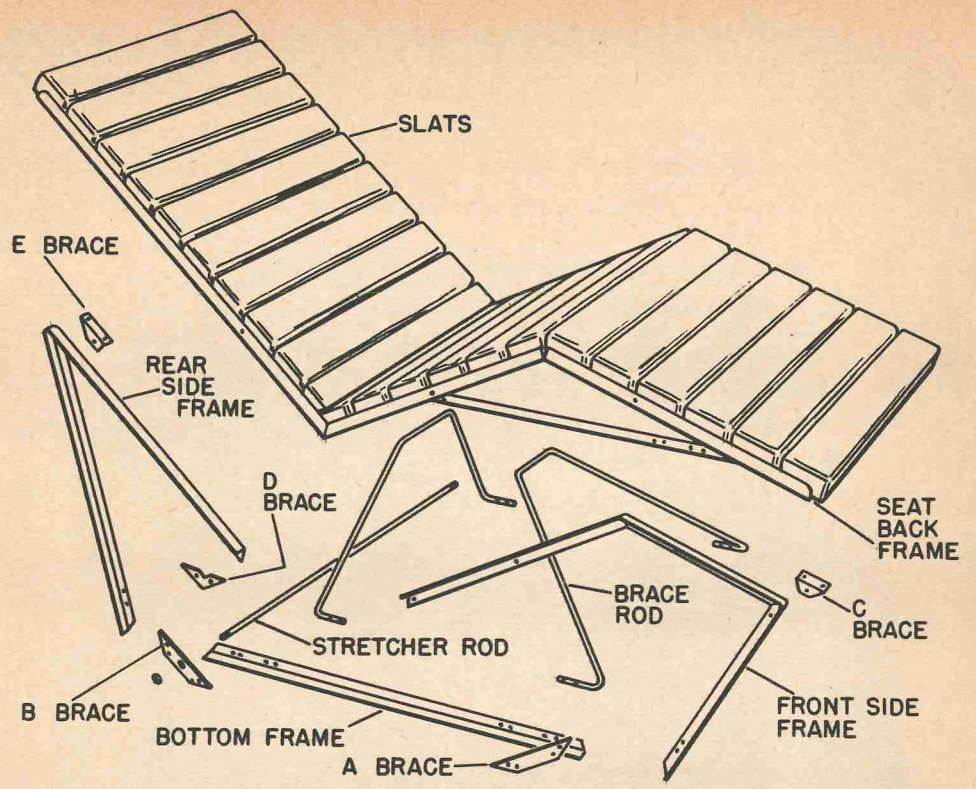
Back-seat frame pieces can be drilled for wood screws for assembly to slats. Slats are spaced ¼ inch apart along frame. Holes $\frac{3}{16}$ inch (diameter) are drilled 2 inches apart. Refer to detail along top of plan for spacing and angle cuts for making corner bends. Bend pieces to shape. Match angles of side frames. Clamp seat-back frame piece to side frame to spot holes for bolting together. Drill through both pieces to insure alignment of holes. Braces C and E can be spotted in place and frames drilled accordingly. Complete assembly of these parts by bolting together.

Slats can be cut to 24-inch lengths, and edges beveled. Treat wood on all sides, as with other furniture in set. Use No. 8 x ¾-inch wood screws to join the slats to frames.

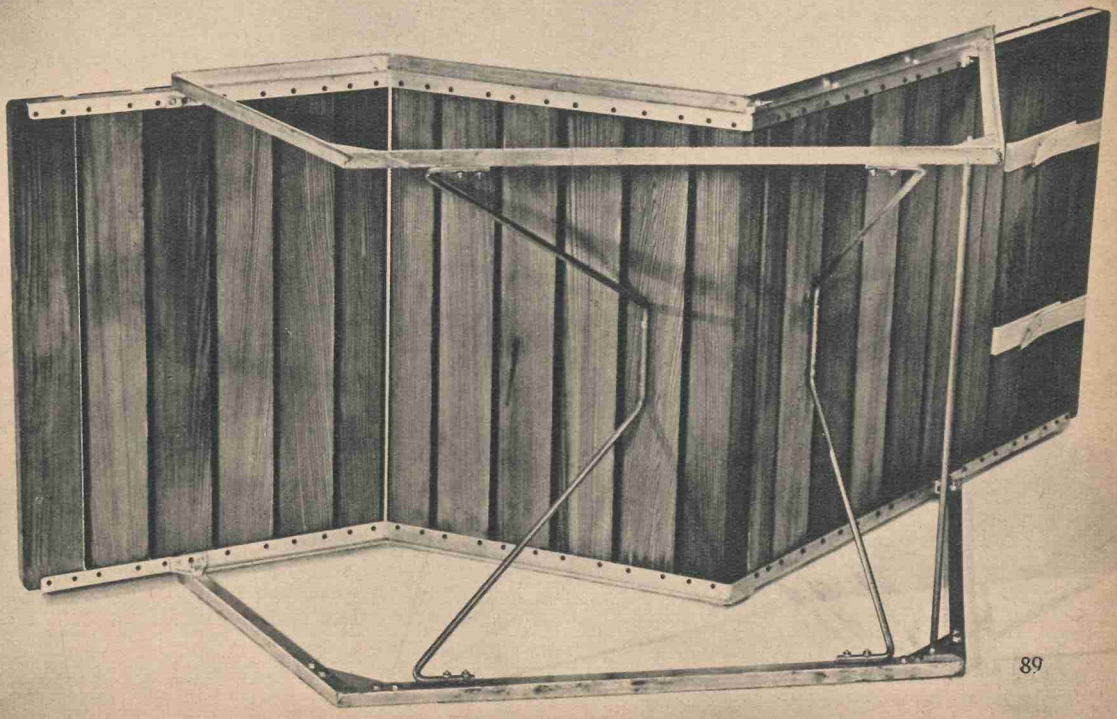
The ⅜-inch (diameter) aluminum rod bracing is now added. Measure length and bend positions with a piece of string. Bend rod to shape, checking fit, as you progress. Make bends at center first. These should be 4 to 5 inches apart. Then hold rod in position under seat and make bends for joining to side frame at bottom. Drill for bolts when final fit is obtained. Here again it is well to clamp both parts and drill both together for good alignment. Fasten with No. 10-32 x ⅝-inch bolts. Use wood screws in underside of slats.

The stretcher rod is a 24-inch length of ⅜-inch stock. Thread both ends for nut or bend and fasten with bolts in same manner as under-seat braces.

Rub down aluminum surfaces with steel wool to finish up. •



Bend angles carefully and anchor braces securely to provide maximum strength in all lawn pieces.



Serving Cart

By Gerhard Grunfeld

Sparkling in appearance, this handy serving cart is a real aid for host or hostess—a time-and-work saver for both indoor and outdoor living.

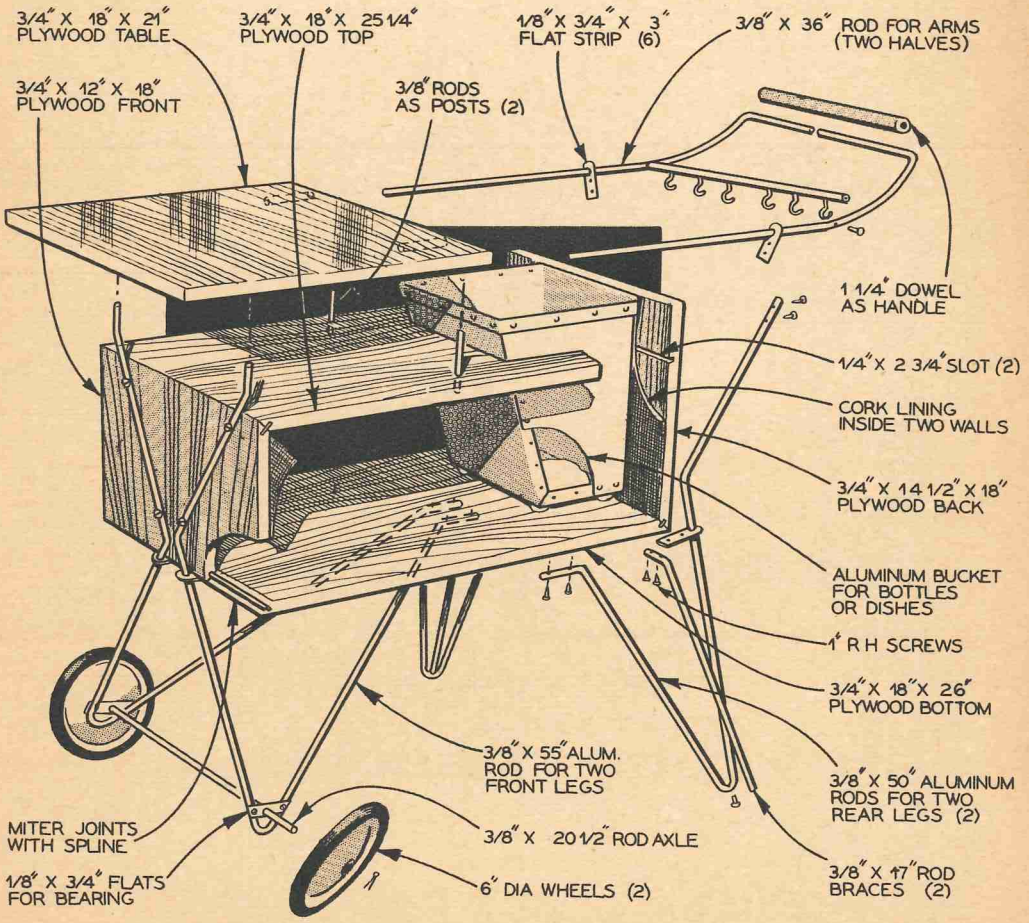
Designed by Gerhard Grunfeld

IN designing this serving cart the following factors were taken into consideration: The cart should be functional. It should be a time-and-work saver, eliminating many trips to the kitchen when serving or cleaning up. It should be useful in outdoor settings where a host or hostess often has to travel a long distance to get to the kitchen—one trip with this cart should provide enough food and serving utensils for a medium-sized group's serving. Large wheels should be used to make the cart more easily maneuverable.

The cart has a capacity to hold a large number of bottles and ice cubes (in what is normally the dish well). There is sufficient space for silverware, clean dishes, serving platters, and extra space for the storage of pots, pans, and other containers. Between the arms of the cart handle, there is a rod with six attached hooks, which can be used to hold cups, bottle and can openers, and other small utensils. There is also space for towels. The cart, which is 30 inches high, can be utilized as a table or buffet. It can also be used as a portable bar.

Aluminum, apart from being easy to work with and having ideal weather-resistant qualities, has a very clean and sparkling appearance; it is light in value and therefore goes very nicely with dark woods. For the construction of the serving cart, black walnut (veneered plywood) was selected to go with the aluminum. The simplicity of the design, together with the materials used, makes the cart an attractive piece of furniture which will stand out in any setting. It is fairly easy to build, and requires only 18 to 20 hours to construct. Materials cost approximately $30.

You can make your work a lot easier (and insure accuracy) if you make a full-

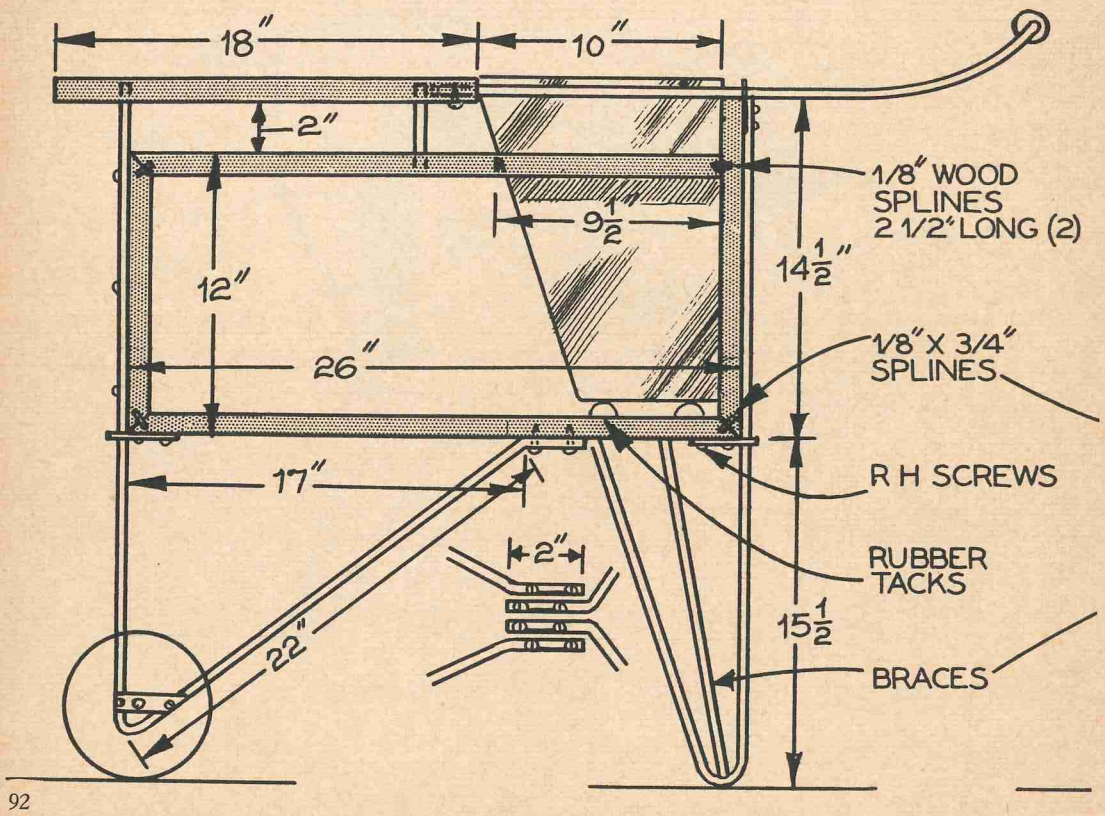


size, side-view layout of the serving cart on a piece of wrapping paper as a guide before you start construction. This will give you exact dimensions, and will help a great deal in the forming of the aluminum parts.

Once all of the materials have been gathered, you can begin construction. Construct the wooden cabinet box first, as the cabinet box is in one way or another connected to all other parts. Cut the cabinet blanks from veneered ¾-inch plywood according to dimensions given on drawing. When all cuts have been made, there will be five separate wooden parts: the cabinet top, front, bottom, and back, and the serving top. The pieces are then mitered and joined by splining; care should be taken that the veneered surfaces of the wood face up and out. The edges and the undersurfaces of the wood parts can also be covered with veneer if desired. Cover the inside walls of the front and back of the box with a thin cork lining.

Next the arms of the cart handle and the front and back legs should be bent to shape. This can best be done on a form or cold bender. If a cold bender is not available, heat can be used to help shape the parts.

Do-It-Yourself Aluminum will lend itself well for making aluminum hardware which will add strength and stability to the cart. Six 3-inch strips cut from ⅛ x ¾-inch stock are used for this purpose. The pieces establish a sturdy joint between the aluminum and the wooden parts; the hardware helps to prevent any part from becoming loose or twisting out of shape from wear.

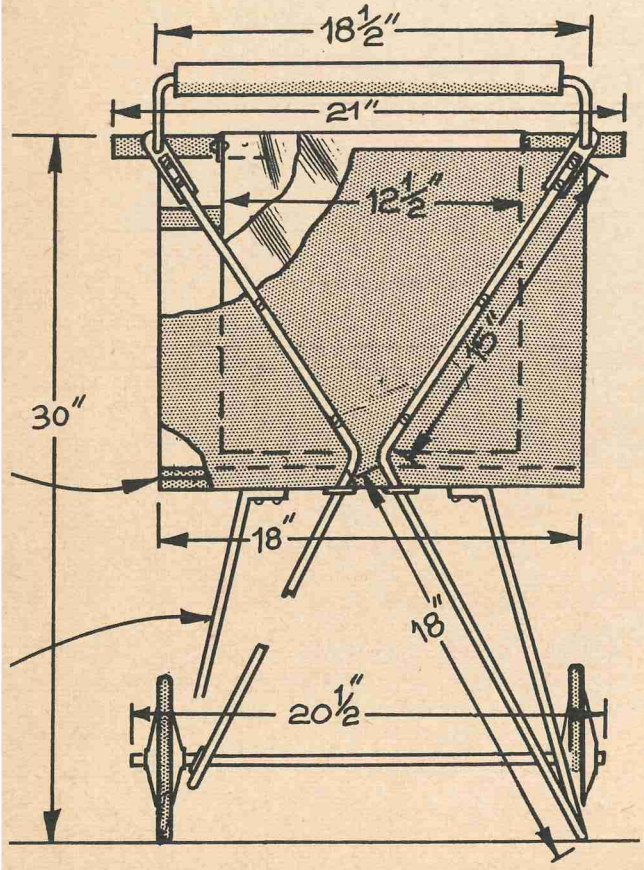


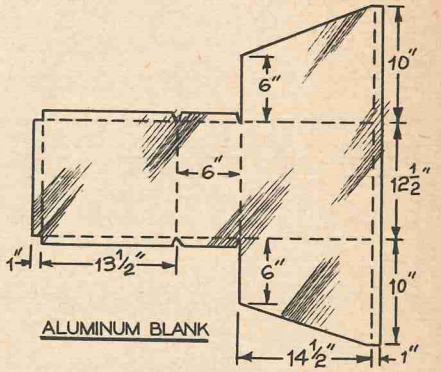
Once the legs and the handle have been shaped, they should be carefully fitted against the wooden body of the cart using the aluminum hardware pieces. Secure lightly, or mark positions for screws. No final adjustments should be made yet. The wheels and axle can also be temporarily assembled. The axle is secured to the legs by bar-aluminum bearings.

Lay out the dish well on a 36 x 36-inch sheet of aluminum. Cut out and form on a bender or by use of a straightedge. Next rivet the sides together. A 1-inch band is fitted around the top of the dish well and riveted into place. Screw aluminum angle handles into place at the top inner edge of the well. Apply "liquid aluminum" to all joints in order to make the dish well water-tight. The well, of course, is removable, and should be made to slip freely through the top of the cabinet box. The well rests on rubber-headed tacks.

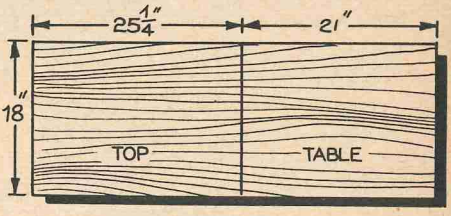
Fasten a 7½ x 7½-inch square of sheet aluminum to the top or serving area of the cart, for use as a hot plate and to prevent damaging the wood surface with heavy or irregular metalware. If you like, you can score the sheet with a sharp knife or other pointed instrument to produce a design.

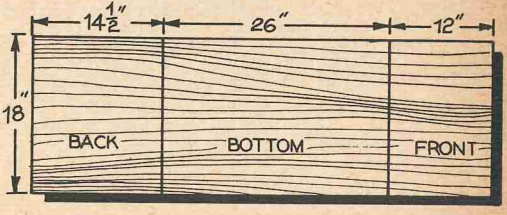
To achieve a proper finish, the cart should be disassembled before lacquering. Sand all wooden parts with fine-grit paper. Rub the aluminum with fine-grade steel wool, in one direction only, for an even finish. Coat the wooden parts with sealer before lacquering. The metal parts can be rubbed with a rubbing compound to bring out their full sheen; they do not have to be lacquered. When dry, the serving cart can be reassembled and waxed. •

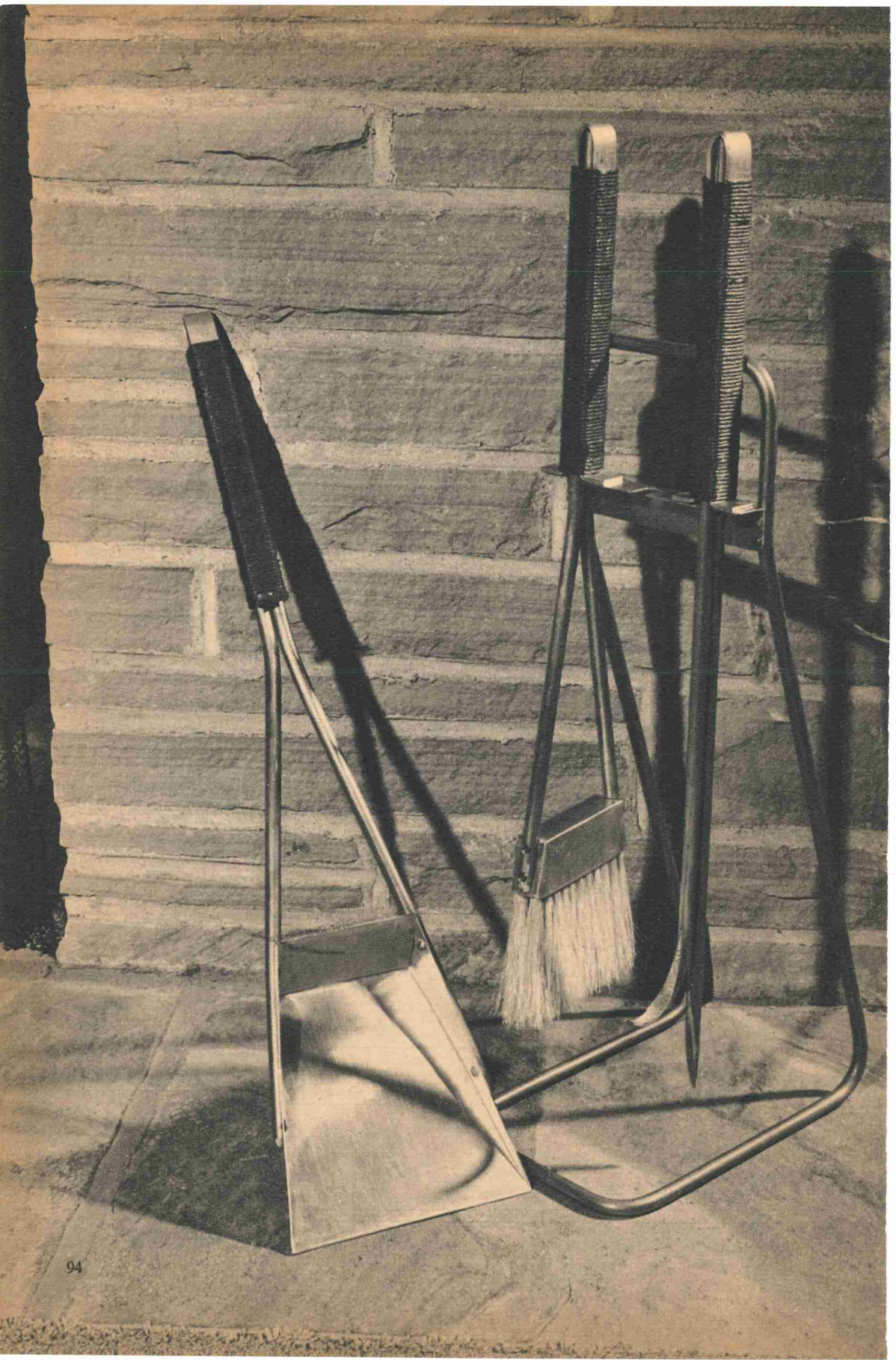




CABINET BLANKS CUT FROM VENEERED ¾" PLYWOOD







Fireplace Set

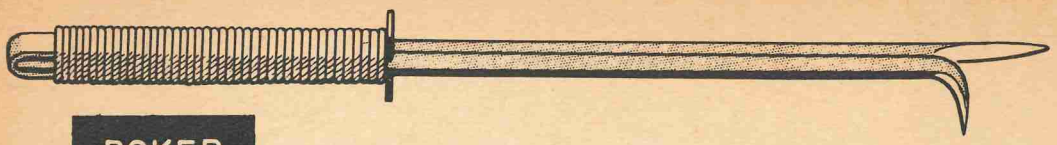
Colorful, lightweight, and quite easy to make, you'll find these fireplace tools make themselves at home on any hearth.

Only Do-It-Yourself Aluminum plus a whitewash brush, a ball of dyed jute cord, and miscellaneous screws are needed to build this modern fireplace set.

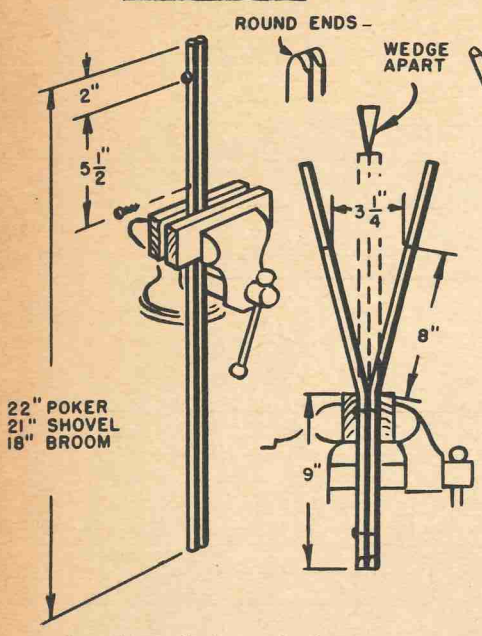
COLORFUL, lightweight and easy to make, you'll find these fire-place tools make themselves at home on any hearth. Only Do-It-Yourself Aluminum plus a whitewash brush, a ball of dyed jute cord, and miscellaneous screws are needed to build this modern set.

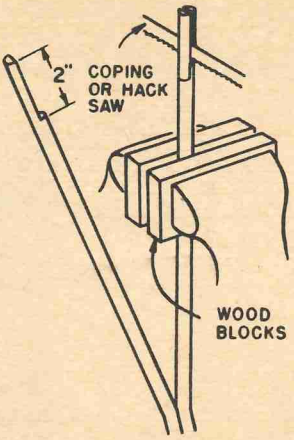
To get started, cut the handles to length, 22 inches for the poker, 21 inches for the shovel, and 18 inches for the broom. Before bending the shovel and broom handles apart, fasten them together with No. 8 x ¾-inch sheet metal screws. Wedge the two rods apart, and bend to fit the shovel's scoop and the brush. Rough out the flat parts at the ends with a hacksaw or coping saw; then file to fit snugly along the sides of both brush and shovel's scoop.

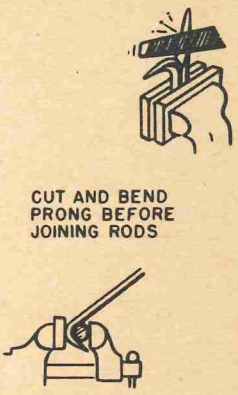
You'll want to shape and form both pieces of the poker and hook rods before joining them. Taper ends of both pieces on a jointer, jig, or band saw, or by hand with a hacksaw; rasp and file smooth. Bend the



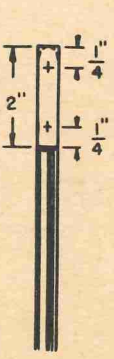
POKER



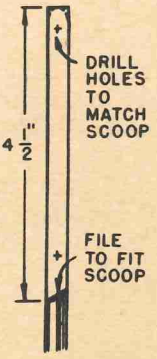




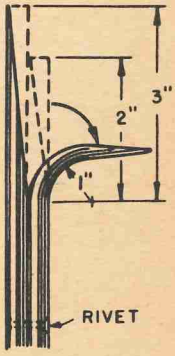
HANDLE DETAILS



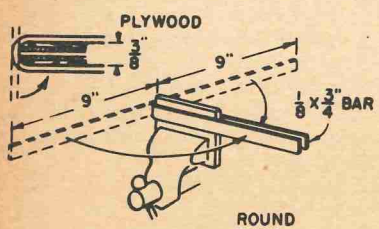
BROOM HANDLE

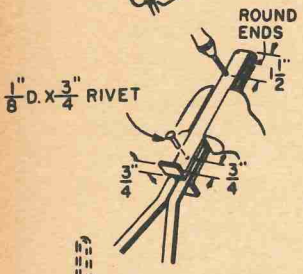


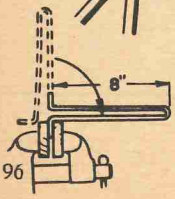
SHOVEL HANDLE

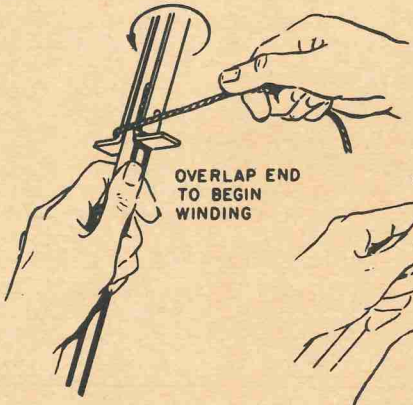


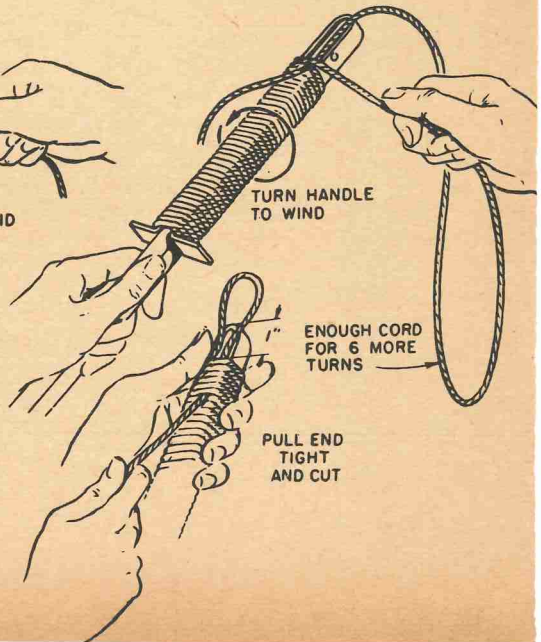
POKER

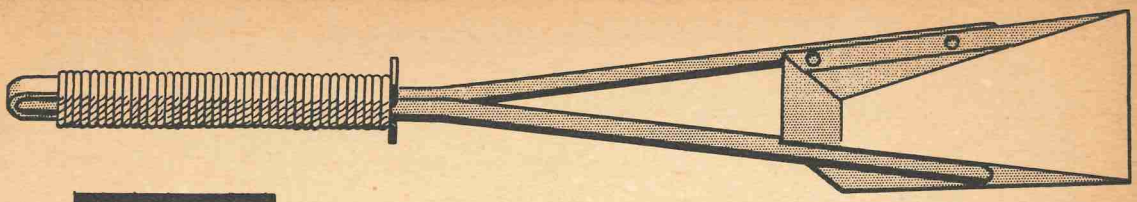




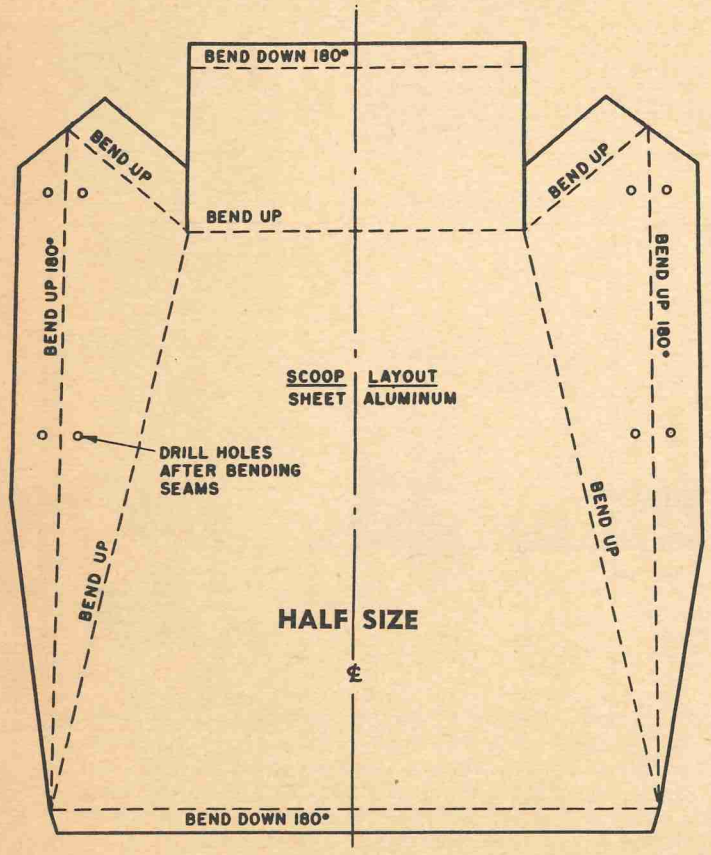


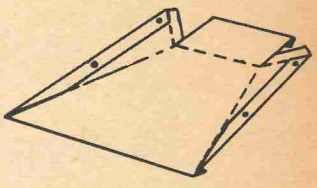




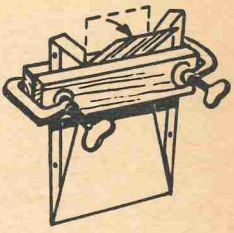


SHOVEL





FOLD SEAMS

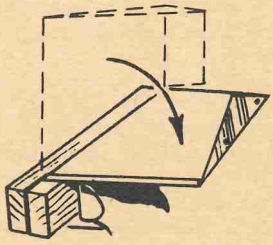


BEND BACK

hook in a vise or with a monkey wrench.

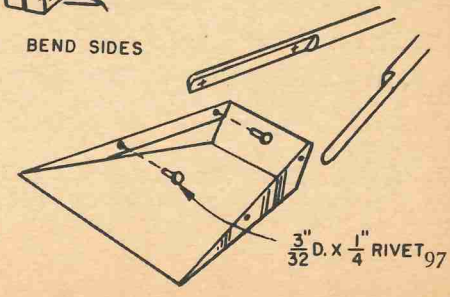
As a cover for the rod handles, bend the ⅛ x ¾-inch bar over the rounded handle ends and fasten it to the rods with ⅛-inch diameter x ¾-inch rivets. Wrapping cord of dyed jute, or venetian blind cord in a color to match your room's decorative scheme, is used to wind the handles.

To make the shovel scoop, make a full-size pattern and trace it onto a plain sheet of Do-It-Yourself Aluminum. The aluminum sheet can be easily cut with ordinary scissors or tin snips. Bend up the edge seams first between hardwood blocks, then hammer flat on a bench with a mallet (ex-

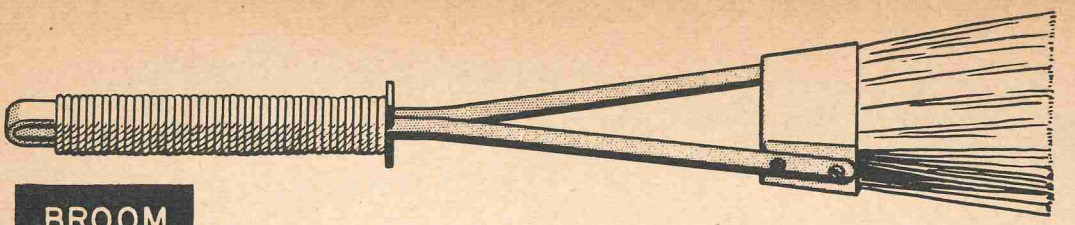


BEND SIDES

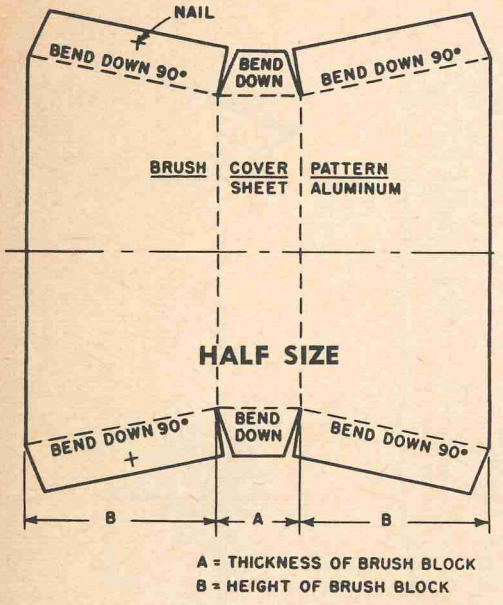
TUCK FLAP UNDER SEAM

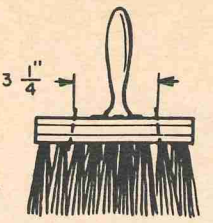


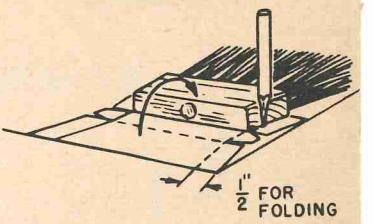
SCREW TO HANDLE

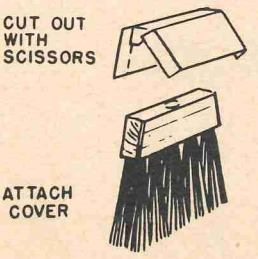


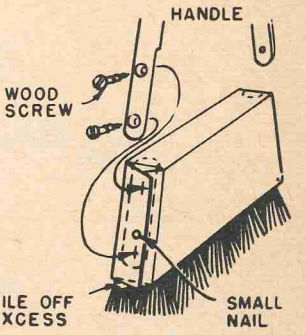
BROOM











cept along top of back). Bend up back and sides, tucking flaps under back edge seam. Fasten the back flaps with 3/32-inch diameter x 1/8-inch aluminum rivets (cut down from 1/4-inch length). Attach the scoop to the handles with two 3/32-inch diameter x 1/4-inch rivets along each side. Countersink holes in rod on outside and file flush after driving head.

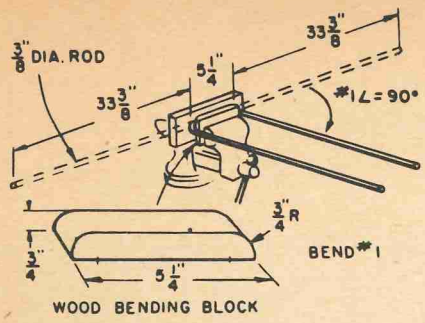
Lay out the hood for the brush by rolling it on the aluminum sheet, marking the sides and allowing at least 1/2 inch along each end. See half-size pattern for reference. Screw the ends of the handle through the overlapped ends and into the wood with No. 6 x 3/4-inch flathead screws, countersunk flush in the handle rods.

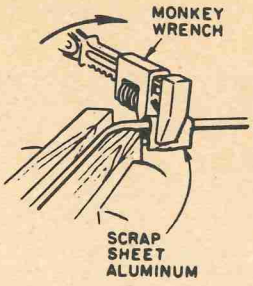
The frame is bent from one rod, with a lap-joint at the bottom. File out the lap joint after cutting off the short ends left over and fasten with two 1/8-inch diameter x 7/16-inch rivets (cut down from 3/4-inch length). Countersink holes and file both sides smooth after driving head. If you shouldn't happen to have a 6-inch piece of 1/16 x 1 x 1-inch angle for the notched support bar, bend up an angle from a doubled sheet of aluminum. Rivet the lips on the underside of the support bar with 3/32-inch diameter x 1/4-inch rivets. •

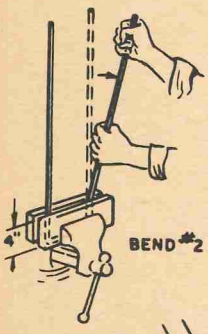
MATERIALS LIST

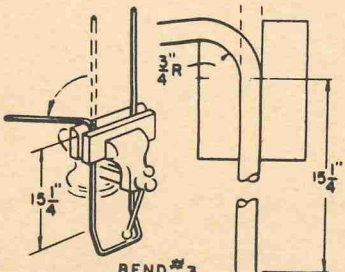
No. Reqd.	Size	Use
2	3/8" dia. x 22" rod	poker
2	3/8" dia. x 21" rod	shovel
2	3/8" dia. x 18" rod	brush
1	3/8" dia. x 72" rod	stand
1	1/16 x 1 x 1" angle x 6" long	support bar
3	1/8 x 3/4 x 18" bar	handles
1	.020 x 8 x 8" sheet	shovel scoop
1	.020 x 5-1/2 x 3-1/4" sheet	brush cover
6	No. 8 x 3/4" sheet metal screws	
8	1/8" dia. x 3/4" aluminum rivets	
4	No. 6 x 3/4" flathead wood screws	
10	3/32" dia. x 1/4" aluminum rivets	
1	whitewash brush	
1	200" ball of 3/32" dyed jute cord	

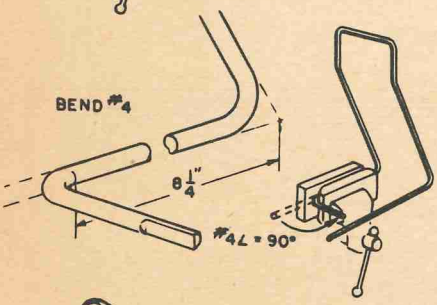
TOOL STAND

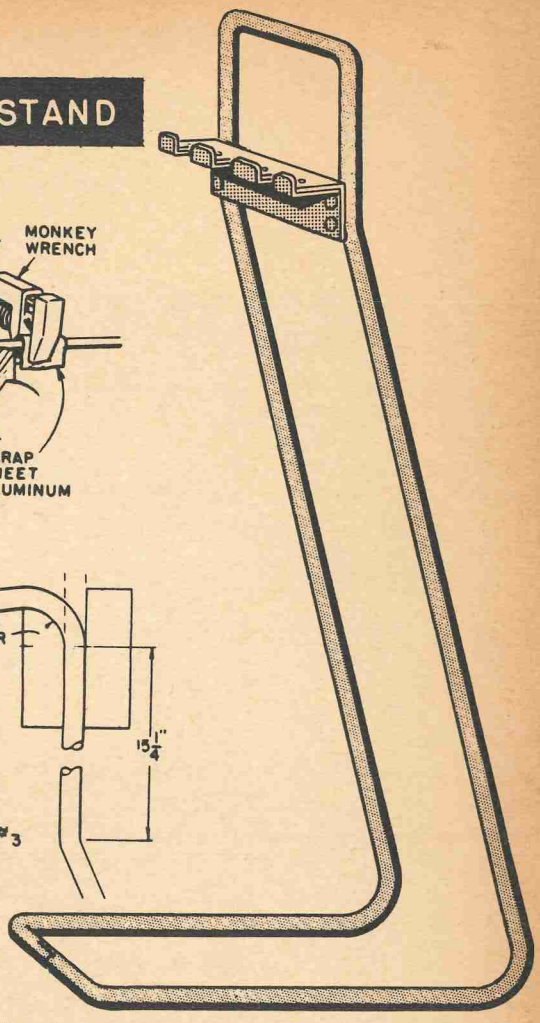

3/8" DIA. ROD
33 3/8"
5 1/4"
33 3/8"
#1 ∠ = 90°
3/4" R
1 1/4"
5 1/4"
BEND #1
WOOD BENDING BLOCK

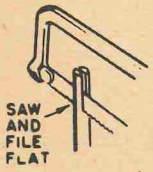

MONKEY WRENCH
SCRAP SHEET ALUMINUM

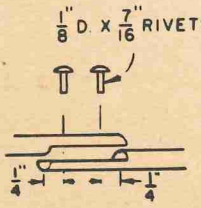

4"
BEND #2

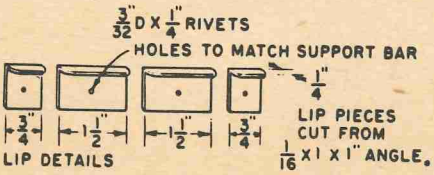

3/4" R
15 1/4"
15 1/4"
BEND #3

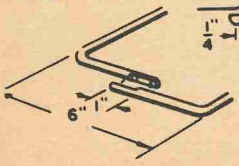

BEND #4
8 1/4"
#4 ∠ = 90°

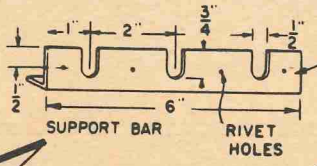


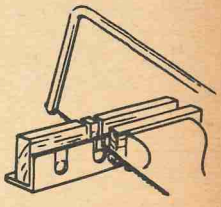

SAW AND FILE FLAT

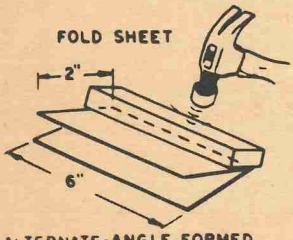

1/8" D. X 7/16" RIVETS
1/4"
1/4"

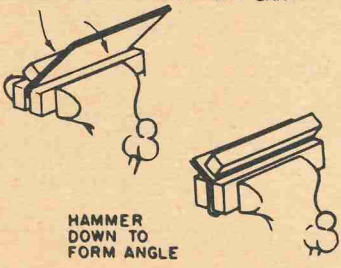

3/32" D X 1/4" RIVETS
HOLES TO MATCH SUPPORT BAR
1/4"
3/4"
1 1/2"
1 1/2"
3/4"
LIP DETAILS
LIP PIECES CUT FROM 1/16 X 1" X 1" ANGLE.

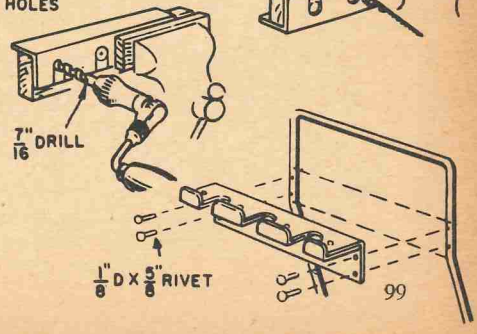

6"
1"


1"
2"
3/4"
1/2"
1/2"
6"
SUPPORT BAR
RIVET HOLES
1/16 X 1 X 1" ANGLE




FOLD SHEET
2"
6"
ALTERNATE-ANGLE FORMED FROM SHEET ALUMINUM, SLOT FOLDED EDGE


HAMMER DOWN TO FORM LIP
HAMMER DOWN TO FORM ANGLE


7/16" DRILL
1/8" D X 5/8" RIVET

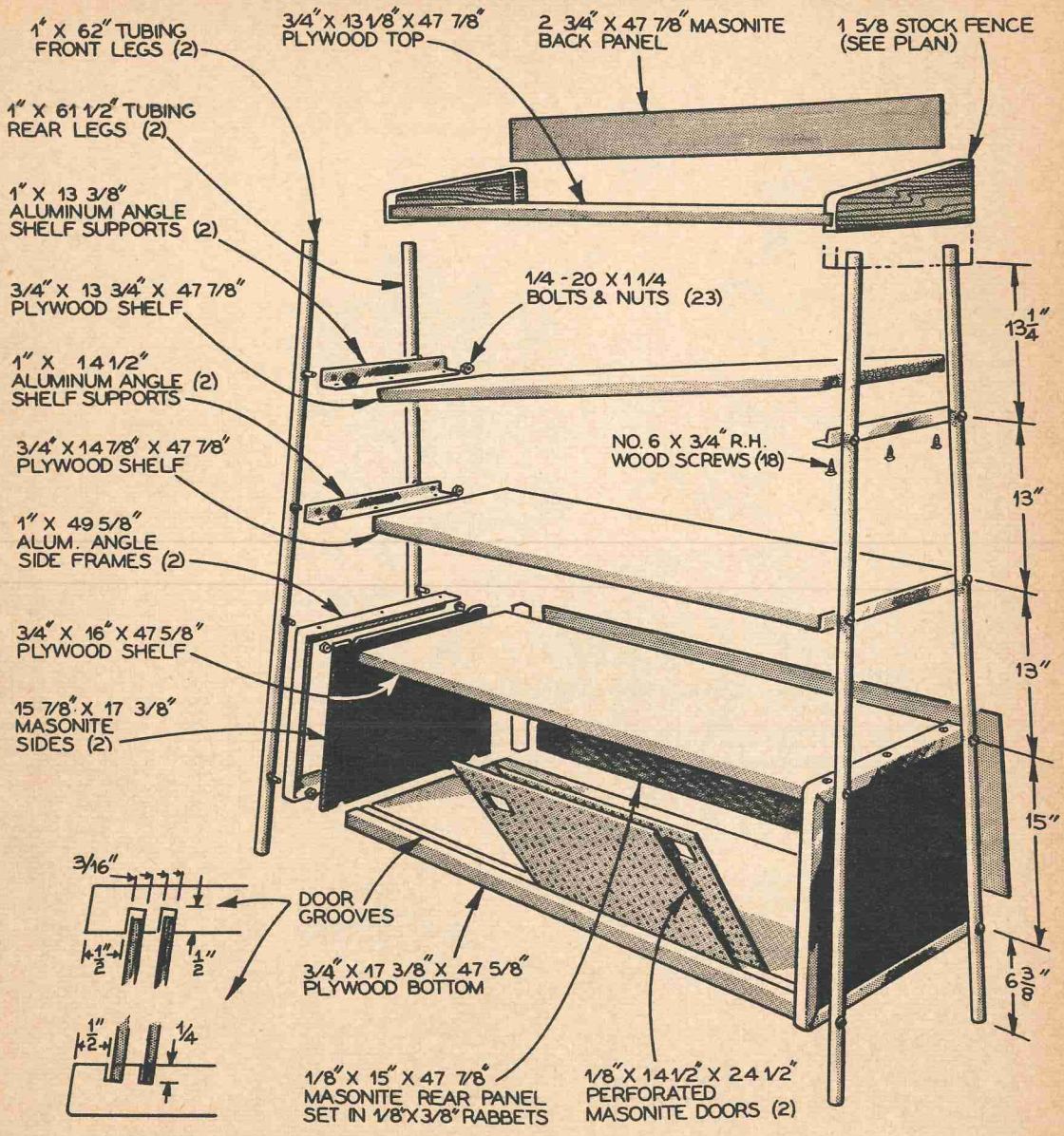
Room Divider

Build yourself a modern room divider and break up that large room into smaller, more livable areas.

A ROOM divider serves to "break up" a large room into two smaller, more livable areas. This project can certainly be used for that purpose, or simply to provide additional modern shelving space. The materials used in the project are exceptionally easy to work: aluminum, plywood, and masonite. The design calls for aluminum tubing legs, which contrast interestingly with the dark-finished wood of the shelves and end panels. The perforated masonite also adds an up-to-date note in the appearance of the entire project.

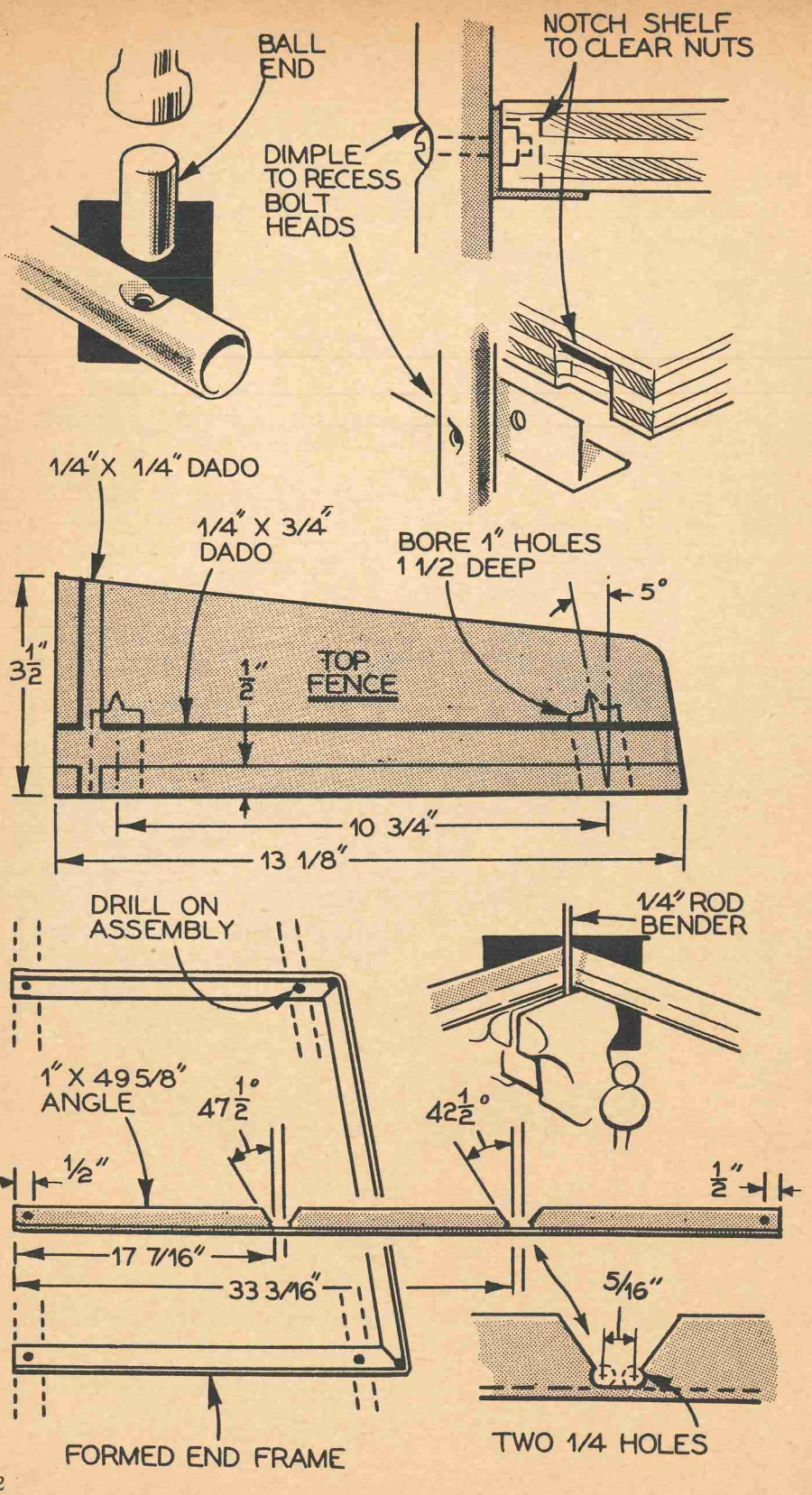
LEG SECTIONS

Begin the project by making a full-size layout of one end section on a large piece of wrapping paper. The layout comes in handy for checking the size and proper assembly of the metal parts—and should save you considerable time and energy later; perhaps even money.

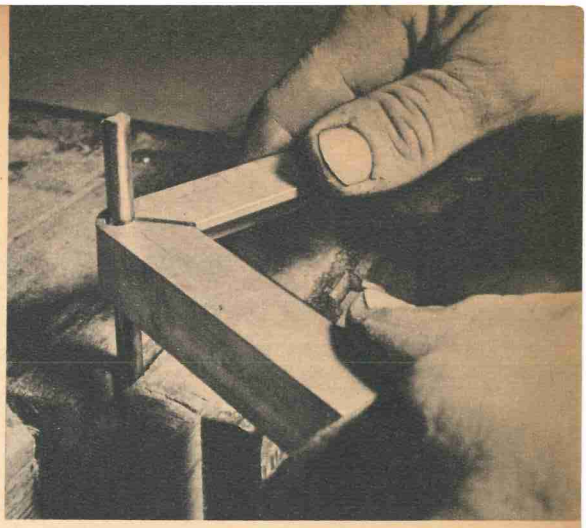


Saw your two pair of aluminum tubing legs to the proper length first—note that the rear legs are ½ inch shorter than the front legs, to compensate for the slight angle at which the front legs are set. Then saw the aluminum-angle shelf supports and the aluminum-angle side frames to the correct overall length, as indicated on the exploded view.

At this point, carefully study the detail drawing of the formed end frame. This will show you how to mark and drill the aluminum angle so that it can be bent properly at the corners. Remember to mark and bend your angle for left- and right-hand frames. Note that two ¼-inch holes are drilled ($\frac{5}{16}$ inch apart) in the angle at the point where each bend is to be made. For accuracy and to give your drill a good seat, be sure to centerpunch before drilling. After drilling the holes, cut away a wedge of metal at the angle indicated and


BALL END
NOTCH SHELF TO CLEAR NUTS
DIMPLE TO RECESS BOLT HEADS
1/4" X 1/4" DADO
1/4" X 3/4" DADO
BORE 1" HOLES 1 1/2 DEEP
5°
3 1/2"
1/2"
TOP FENCE
10 3/4"
13 1/8"
DRILL ON ASSEMBLY
1/4" ROD BENDER
1" X 49 5/8" ANGLE
47 1/2°
42 1/2°
1/2"
1/2"
17 7/16"
33 3/16"
5/16"
FORMED END FRAME
TWO 1/4 HOLES

To bend aluminum angle properly, first drill two ¼-inch holes at point where bend is to be made.



Cut away wedge of metal to angle desired; form the metal around a length of rod held in a vise.

form the frame around a length of ¼-inch rod held in a vise.

Lay out the aluminum parts of each end section on the full-size drawing and carefully mark positions for machine-screw attachment of the side frames and shelf supports to the legs. Drill ¼-inch holes through the legs to receive ¼-20 x 1¼-inch round-head machine screws. Mark and centerpunch accurately before drilling. Dimple or indent the outside leg hole to receive the screw head. Use the rounded end of a wood or metal rod to make the indentation, striking cleanly with a mallet or hammer.

Now mark and drill ¼-inch holes in the shelf supports and side frames, checking carefully to see that the position of each hole matches the corresponding hole in the leg. Then insert machine screws and assemble the end sections.

SHELVES

The five shelves are made of ¾-inch plywood. The top shelf has a ¼-inch dado near the back edge to house the masonite back panel. The two bottom shelves have angled dados toward the front edge to house masonite (perforated) sliding doors. There is also a rabbet cut in the back edge of the two bottom shelves. This rabbet houses the back panel of the cabinet.

After cutting the dados and rabbets in the proper shelves, the only remaining job is to cut or bore notches in the shelf ends for the hex nuts on the machine screws. Bore the notches by placing a piece of scrap wood end-to-end with the shelf and bore a half-hole in each piece of wood. Be careful not to bore through the top surface of the shelf.

Next, chamfer the edges and sand each of the shelves. Lastly, place the shelves in position and mark for screw attachment. No. 6 x ¾-inch wood screws are used for attaching the shelves to the aluminum angles. Drill your pilot holes carefully.

The end pieces of the top assembly are made from 2 x 4 stock. Cut dados in them before shaping. Notice that the holes for the legs are 1-inch deep and that the front holes are bored at a slight (5°) angle.

Before joining the bottom two shelves (top and bottom of cabinet) to the legs, the end panels (masonite) and two cabinet cleats must be installed. Notice how the end panels are notched for the machine screws.

Now attach the bottom two shelves to the end frames with wood screws. The back panel (masonite) is added at this point. Use No. 5 wood screws for this purpose after drilling pilot holes.

FINISHING

After sanding all wood surfaces, use a good wood filler, and then paint. The color used, of course, is a matter of taste. A dark finish, however, make a sharp contrast to the bright aluminum. The unit pictured is finished in contrasting DuPont colors: shelving and cabinet in Saxon Grey, with sliding doors in Vassar Yellow.

The masonite doors can be sanded and painted before installing. They can be installed at the same time the top and bottom of the cabinet are attached to the end frames.

Many craftsmen will prefer, of course, to finish all the wood pieces separately before the final assembling. This method will allow you to properly finish the end grain of the shelves and other parts which are not easily reached after assembling. •

Nesting Table

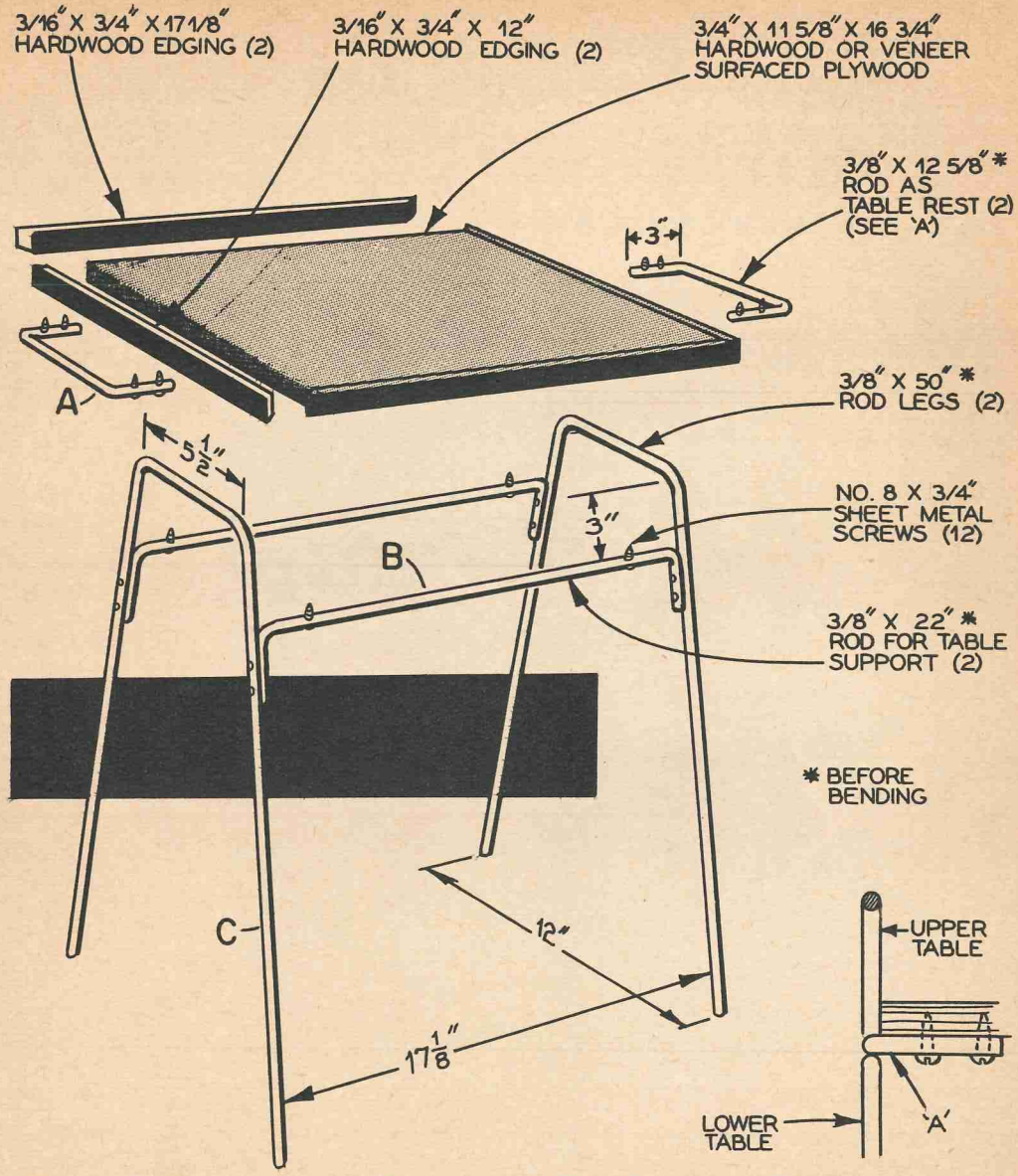
Here's a lightweight table that's ideal for today's casual living. When not in use, several can be stacked together in little space.

Braces, secured to the underside of the table top and extending between the table legs, keep stacked tables from scratching the top of table just below.

LIGHTWEIGHT tables are handy for glasses and a magazine alongside a favorite chair. They fit in with today's casual living for serving television snacks. When not in use, they nest together in little space. The brace, Part A, keeps stacked tables from scratching the top of table below. And they're easy to make from Do-It-Yourself Aluminum.

You'll need a pair of each of the three rods, Parts A, B, and C. Cut one pair of Parts B and C from one 6-foot length of ⅜-inch diameter aluminum rod. Form both braces, Parts A and B, with their ends bent at right angles around a form block. Center the rod for the leg, Part C, on the form block and clamp in vise. Bend legs so bottom ends are 12 inches apart.

Begin the assembly by filing flat sections on the inside of the side braces, Part B. File away about ⅛ inch, leaving ¼ inch thickness. C-clamp the side brace to the inside of the leg, Part C, and drill ⅛-inch diameter holes through both for rivets. Countersink the hole on the outside of the legs, so end of rivets can be formed into the opening. Insert ⅛-inch diameter x ¾-inch aluminum rivets from the inside of the side braces. Form the head on the outside of the leg, forcing the metal into the countersink. File off the remaining rivet head flush with the bar.



The wood table top is next. You can make this out of solid hardwood, but a ¾-inch hardwood veneer plywood is less costly and will be less likely to warp. To hide the plywood's end grain, fit $\frac{3}{16}$ x ¾-inch edging strips of matching wood around the edges, mitering them at corners. Apply glue to the strips and to the edge of the plywood. Hold the edging strips in place with ¾-inch brads until the glue sets.

Sand the table top carefully. Either set the brads around the edges or pull them out. Seal the wood with shellac or lacquer for a clear finish and sand with 6/0 garnet paper. For an open grain wood, like oak or mahogany, apply coat of filler, let dry and sand smooth. Fill the brad holes around the edge with matching stick shellec. Finish with two coats of pale or "rubbed effect" varnish.

Assemble the top by drilling $\frac{5}{32}$-inch diameter holes up through side brace, Part B, for screws into top. Pilot drill $\frac{3}{32}$-inch diameter holes into underside of top for screws. Fasten top to side braces with No. 8 x ¾-inch aluminum sheet metal screws. Insert end brace, Part A, through legs under top. Outside of end brace should be flush with outer plane of legs. Screw end brace, Part A, to the underside of the table top the same way that you did the side braces. •

Occasional Chair

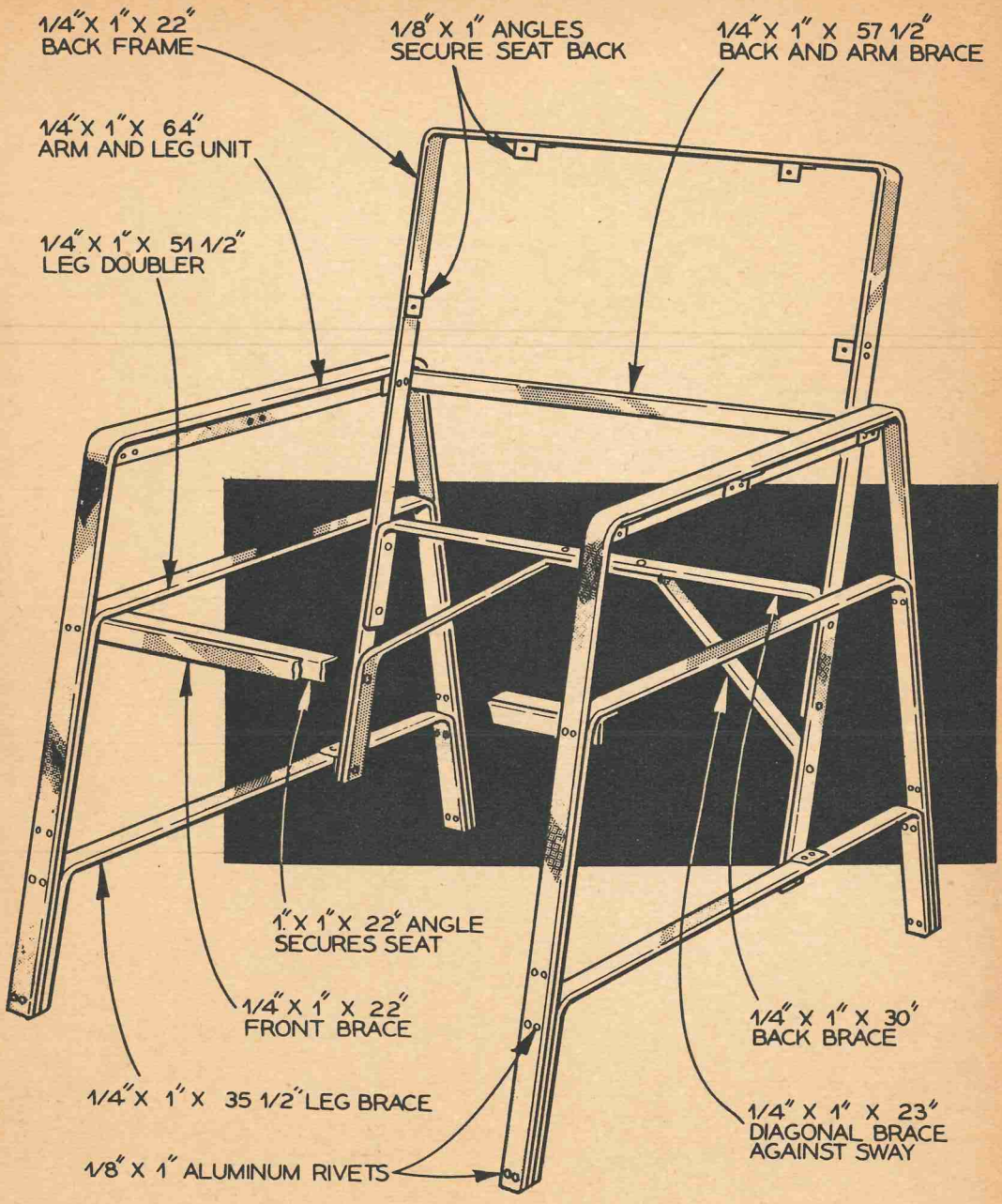
This smart, sleek-looking aluminum frame chair is upholstered with a plastic material, making it suitable for use both indoors and out.

Designed by John W. Davies

THIS chair is an appropriate project for the beginner as well as for the advanced craftsman. The simplicity of the design and the ease with which it may be constructed recommend it especially to the neophyte aluminum worker. These same features, of course, guarantee that you'll have a smart, sleek-looking chair. Plastic upholstery makes it suitable for use outdoors as well as indoors.

ARMS AND LEGS

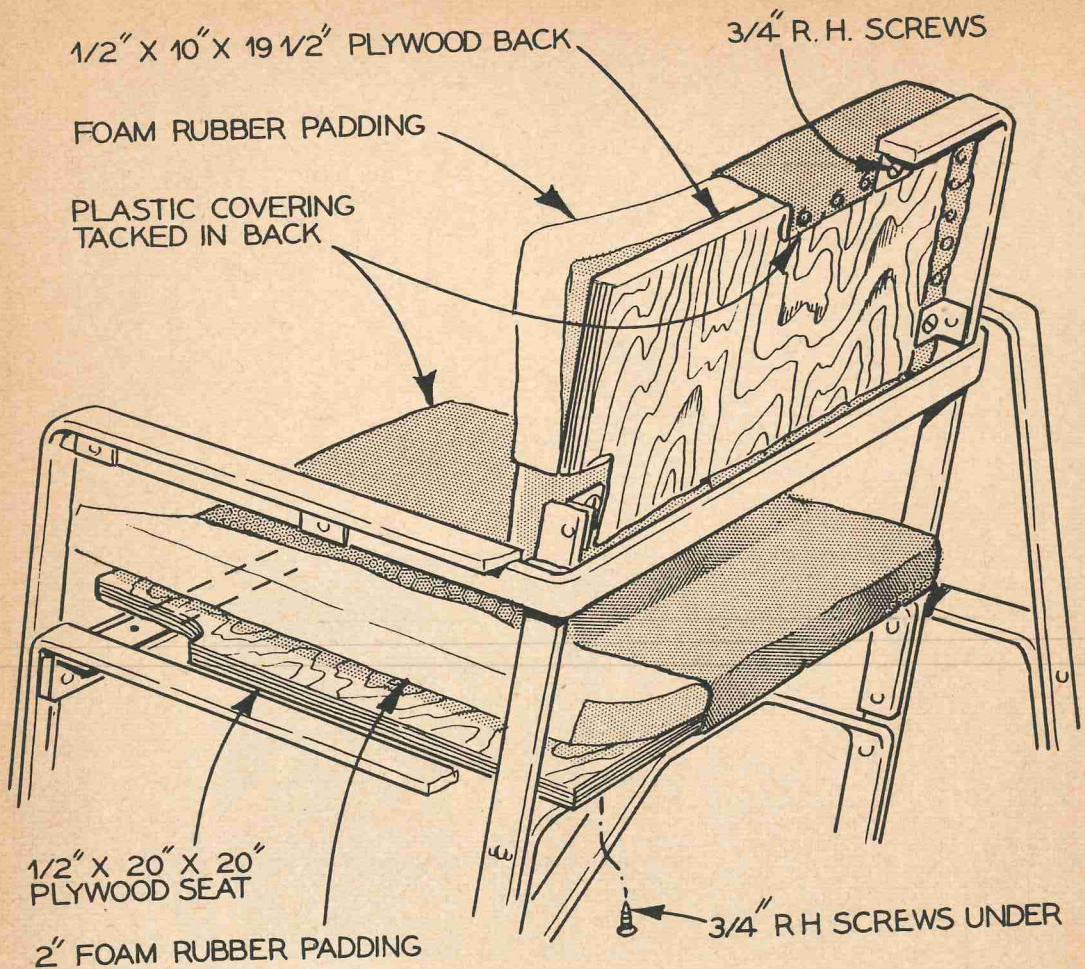
So that both sets of arms and legs will be formed alike, begin by making a full-size layout of one set on wrapping paper. Then, when forming the arms and legs,

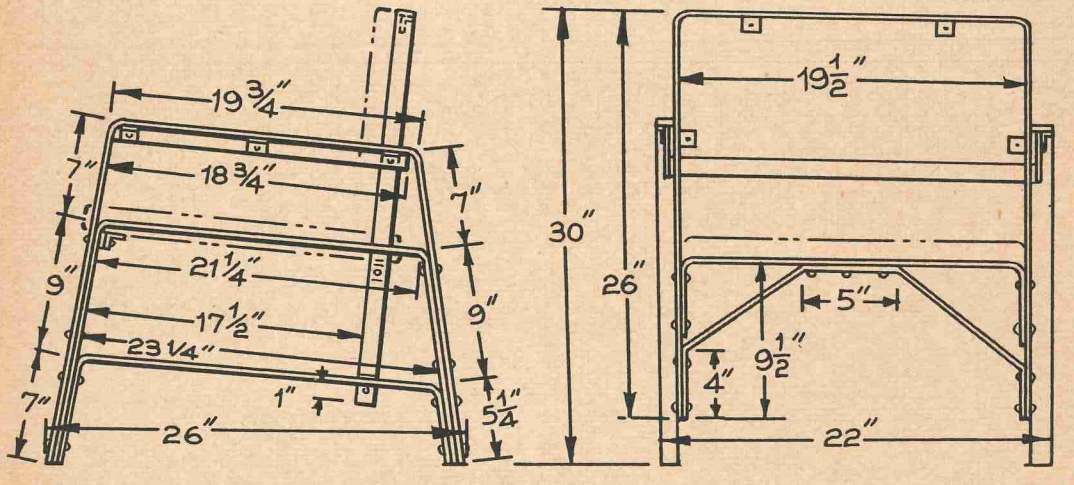


check them against the drawing. Do not trim these pieces to *exact* length until both sides have been formed. This will help you to get both sides equal.

Form all your bar stock around a piece of 1-inch steel pipe. You can use a short length of water or gas pipe for this purpose. Clamp the pipe in a vise. Bend the bar slowly, checking with your drawing until desired bend is achieved. If possible, keep the bar on a horizontal surface while bending so that the bar will not twist.

Now proceed to locate your rivet holes. Mark them accurately and centerpunch each one before drilling. You can put the bars in a vise to drill the rivet holes. Notice


1/2" X 10" X 19 1/2" PLYWOOD BACK
3/4" R. H. SCREWS
FOAM RUBBER PADDING
PLASTIC COVERING TACKED IN BACK
1/2" X 20" X 20" PLYWOOD SEAT
2" FOAM RUBBER PADDING
3/4" R H SCREWS UNDER


19 3/4"
7"
18 3/4"
7"
9"
21 1/4"
17 1/2"
23 1/4"
9"
1"
5 1/4"
7"
26"
30"
26"
19 1/2"
5"
9 1/2"
4"
22"

that the rivets are used in pairs, two at each joint. File smooth to finish.

CHAIR BACK

You can saw the back frame and brace to exact length after forming. Form the two pieces carefully. Now cut a number of aluminum angle braces from ⅛ x 1 x 1-inch stock. File edges smooth, then rivet the angles to the chair back as indicated. (Angle braces are also used under arms and to attach seat back to leg braces.)

The diagonal brace which gives the back of the chair additional rigidity can be cut and formed at this time. Rivet all three back pieces together. Remember, however, that aluminum angle braces must be riveted to the lower ends of the main back piece for attachment to the leg braces.

FRONT AND BACK BRACES

Saw these three pieces to exact length only after they have been given a trial fit in their positions on the chair.

After these braces have been formed and sawed to fit, lay out your rivet holes and drill them, inserting fillets between arm brace and back frame.

The ends of the back-and-arm brace must be filed to fit the bend in the arm stock. Mark this curve with a sharp tool before filing.

Mark, centerpunch, and drill all holes for rivets which are to hold the arms to the arm brace. Note that the rivet holes in the top surface of the chair arms have been countersunk so that the rivets can be peened into them. This will enable you to file and sand the top surface of the arms perfectly smooth.

PLYWOOD BACK AND SEAT

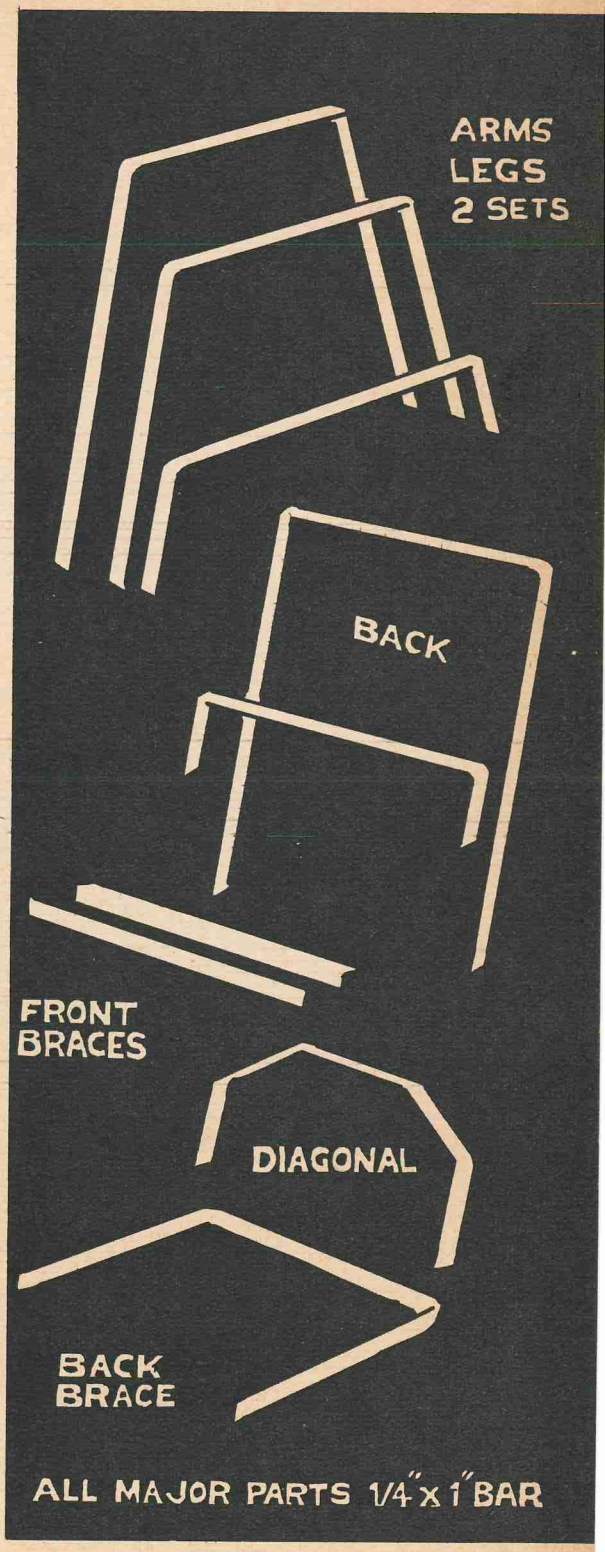
These two pieces of plywood are ½ inch thick and must be upholstered before being fastened to the chair. Cut foam rubber to the shape of the plywood and cement it to the wood with rubber cement.

The upholstery material can be whatever you wish to use. However, a plastic covering will prove useful both indoors and out. Tack the covering to the plywood with short upholstery tacks or carpet tacks.

Both seat and back can be anchored to the frame of the chair with either ¾-inch wood screws or self-tapping screws.

RIVETING NOTE

If the rivets you have on hand are too long, just cut them down with a pair of cutting pliers. If your rivets are too short, you can substitute aluminum machine screws; both ends of these screws can be peened over and sanded smooth. •



Modern Desk

Designed by Werner Schier

This striking desk, which combines aluminum with black lacquered birch and dark walnut, will compliment almost any modern setting.

HERE'S a "ritzy" desk of a really modern design. The materials are modern, too. Gleaming, silvery aluminum is combined with black lacquered birch and dark walnut.

You may want to make changes in the design and measurements to fit your decor. The many shapes of Do-It-Yourself Aluminum which are available will make these changes both easy and possible.

LEG SECTIONS

Make the three metal leg sections first. The two right-hand leg sections are exactly alike except for the tie rods. The third leg section on the left-hand side is only different in that it lacks an aluminum-angle drawer slide.

Saw off six leg angles exactly the same length. Next saw the five angles which are to be machine screwed to the legs in a horizontal position. Remember that two of these angles are drawer-guides or holders and must be machine screwed to the legs at the desired height.

After assembling the angles for each leg section, saw your two tie rods for each section to the proper length. Flatten the ends of each of these rods slightly with a hammer. Do not hammer too hard or too often, however, as this hardens the rod and may cause it to break. Drill holes in the flattened ends and machine screw the rods to the legs.

Triangular gussets made from scrap aluminum can also be riveted into the top corners of the leg sections. These gussets will add much rigidity and strength to the desk.

DESK TOP

The top shown here was made of good birch, doweled and glued together. It can, of course, be made of any hard wood you wish to use. Keep the top one inch or less in thickness though, if you wish to secure an ultramodern appearance. A black lacquered finish will sharpen the contrast of the wood with the bright aluminum.

Screw the metal leg sections to the top with either wood screws or aluminum self-tapping screws. As soon as the top is fastened to the leg sections, saw, form, and then rivet the long rod brace to the back of the desk.

THE DRAWERS

Both of these drawers are made with a slot sawed one inch in from the front edge. Into this slot, a thin piece of plywood (covered on both sides and the top edge with embossed sheet aluminum) can be inserted for the drawer front. Other materials such as glass, colored plastics, and solid wood, can also be used.

The top cover of the right hand drawer must be marked carefully, then sawed and placed in position with the drawer removed. This top cover and shelf can be anchored to the legs in several ways. A small L-shaped brace can be sawed from an aluminum angle and fastened to the leg under the drawer top with a machine screw. An aluminum rod or wooden dowel can be driven into a hole drilled from the front edge of the cover through the leg of the desk. An aluminum wood screw or self-tapping screw will hold the back of the drawer to each leg.

On each side of the right hand drawer an aluminum bar or angle can be screwed. This angle or bar will serve as a rail to rest on the drawer-slide angle which is fastened to the leg sections.

The smaller, left hand drawer rests and slides on an aluminum rod. A slot should be cut in the wooden flanges of the drawer for the rod. The ends of the rods are drilled so that they can be screwed to the top of the desk with long self-tapping screws.

THE SHELF BOX

The shelf box which sets on top of the desk is much simpler to make than would appear at first glance. The corner joints can be either rabbeted or mitred on the table saw and then glued together. An extra piece of wood glued inside each end gives added strength.

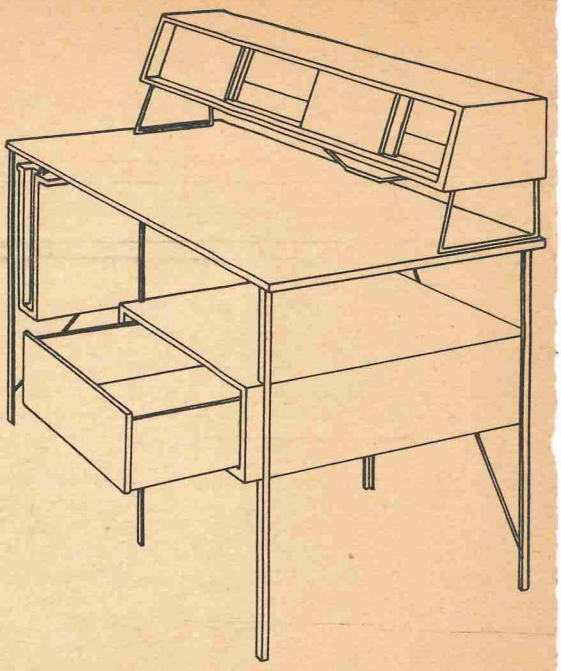
The track on which the four small doors slide can be easily made from aluminum sheeting. Form the metal to an "L" shape and screw down to the wood on the inside of the "L" and out of sight from the front of the desk. There are two of these tracks. Make them double thickness so that the top edge of the track is smooth and round. An aluminum angle with one side sawed short on your table saw, then filed and sanded smooth, would also serve as a track.

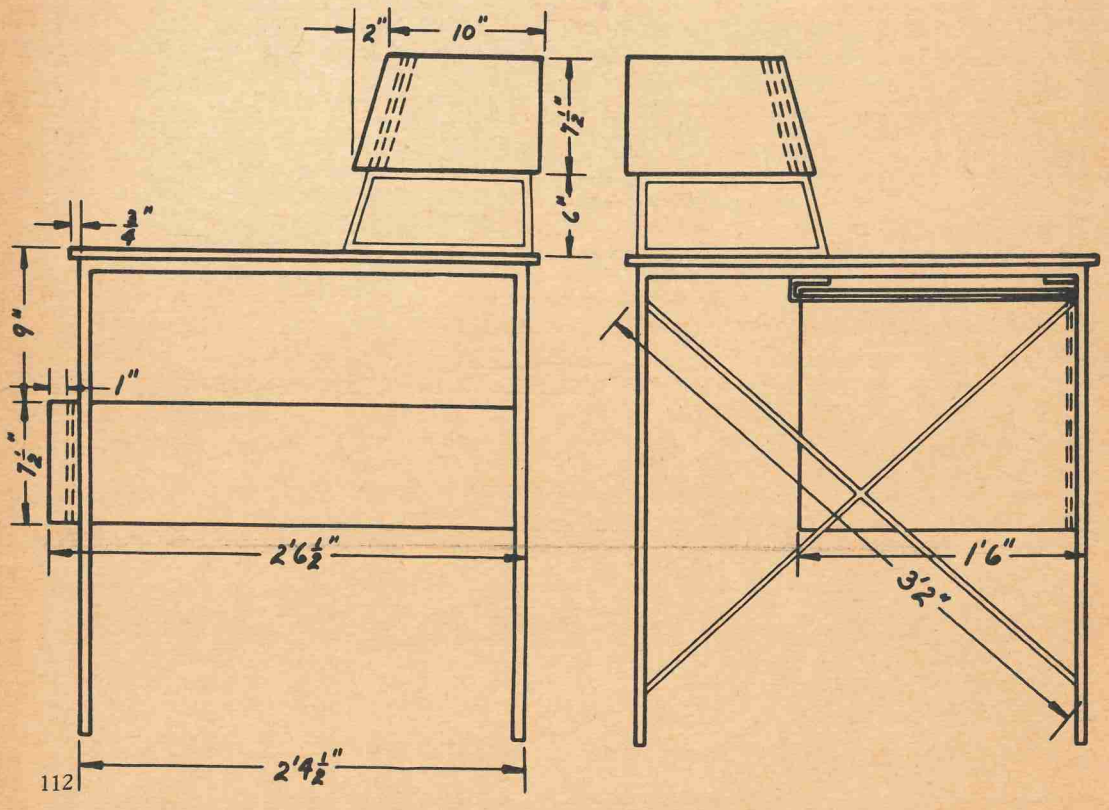
The door panels themselves can be made in several ways. If made of solid wood, they can easily be slotted on the table saw to fit the aluminum tracks. The construction shown here is of solid wood covered with embossed aluminum sheet metal.

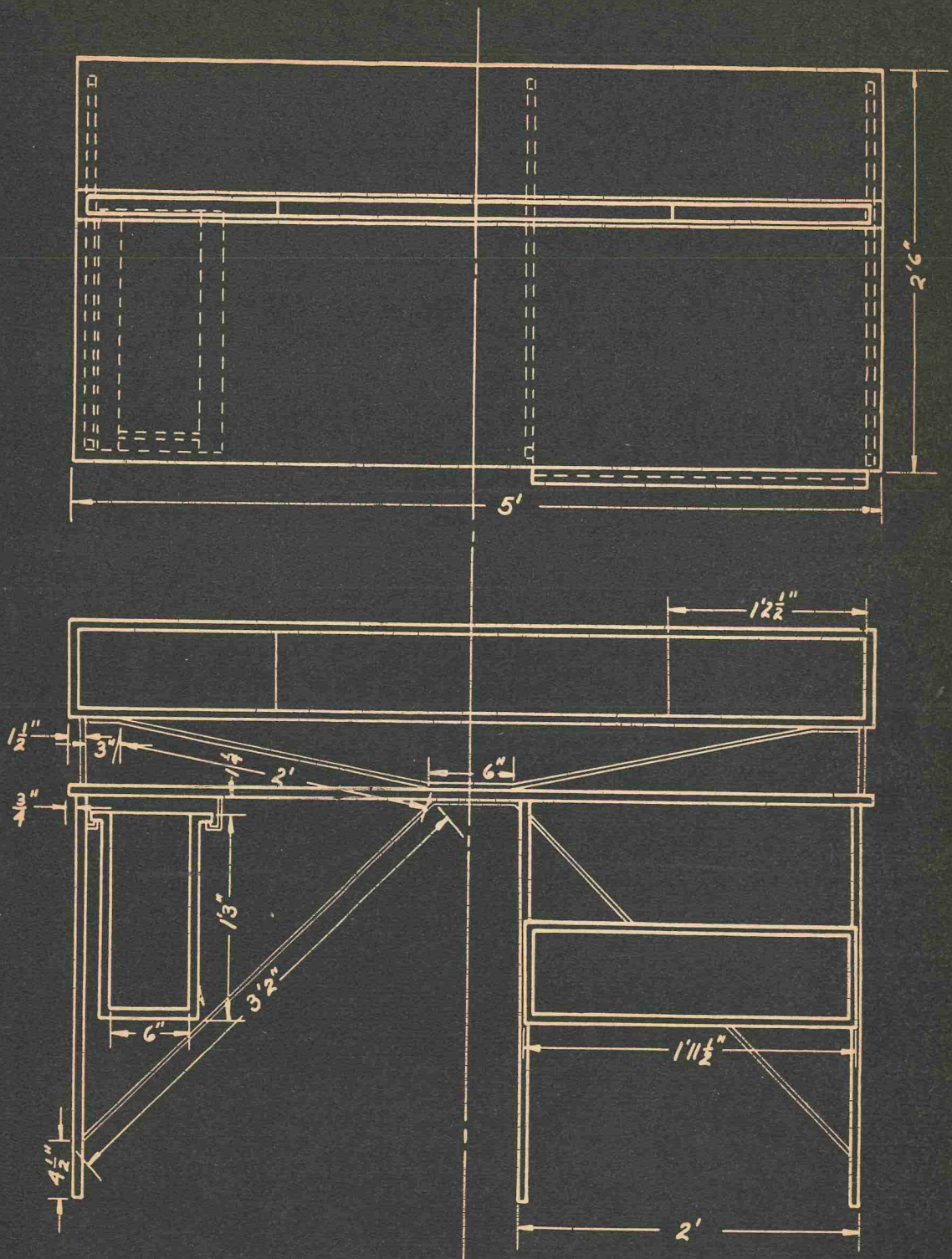
The box shelf shown in the photograph is raised off the desk on four aluminum tubes. These tubes can be anchored to the desk and shelf with a maple dowel rod which runs through the tube. Holes can be drilled into the desk top for the dowels. These can be secured with glue and wood screws.

Another design for supporting the shelf box calls for the use of aluminum rod or box stock which can be formed in a vise. When rods or bars are used it's a simple matter to drill holes for screws which will hold the metal in place.

Tool marks in the aluminum which mar the appearance of the metal can be removed with abrasives. Steel wool, emery cloth, and sand paper can all be used. •






2'6"
5'
1'2½"
1½"
3"
¼
2'
6"
¾"
1'3"
3'2"
6"
1'11½"
4½"
2'

Coffee Table

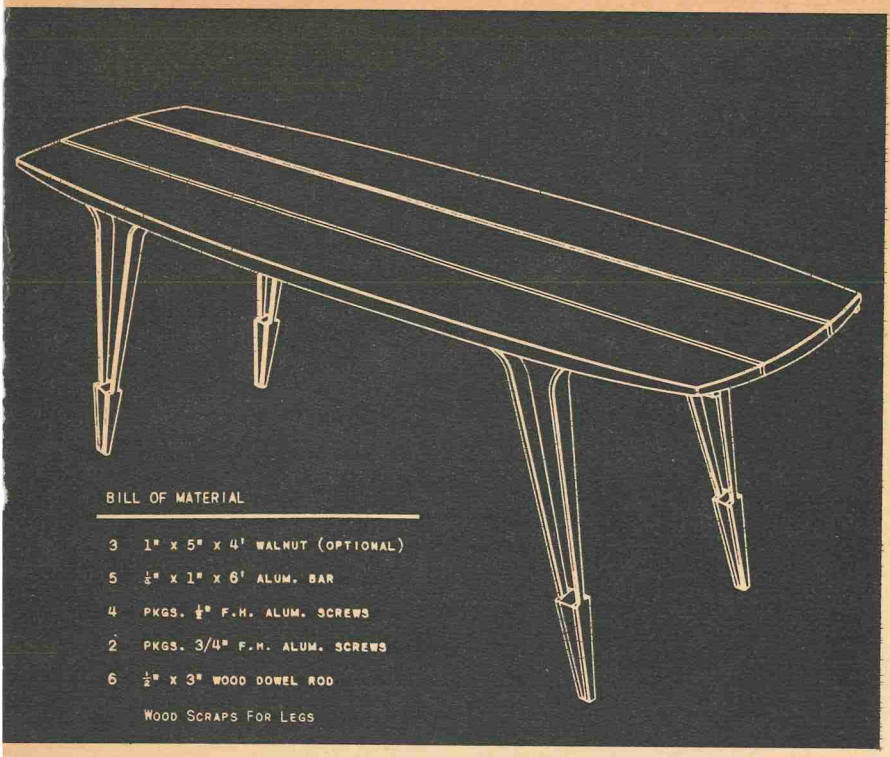
This aluminum and walnut coffee table meets every requirement for modern, functional design.

THIS coffee table, simple in shape and construction, will meet all of your requirements for a modern design. You'll find the combination of aluminum and walnut wood interesting; an artful contrast is achieved between the dark walnut and the silvery aluminum not only in the design of the table top but in the legs as well.

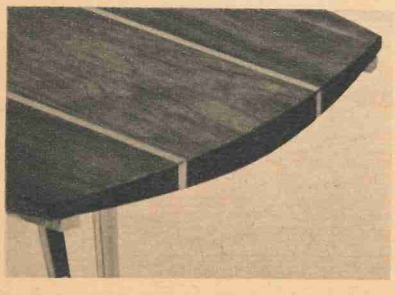
THE TABLE TOP

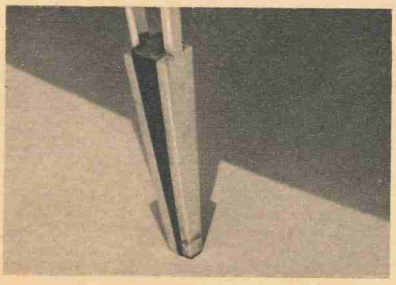
As a first step, saw the three walnut boards that will be joined (with bar aluminum inserts) to form the table top to what-

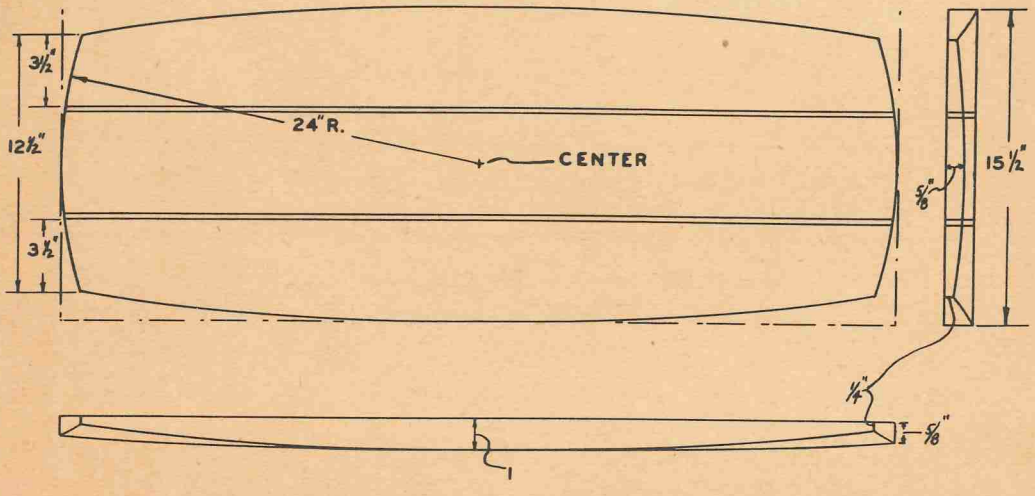
Designed by Edward Bucek

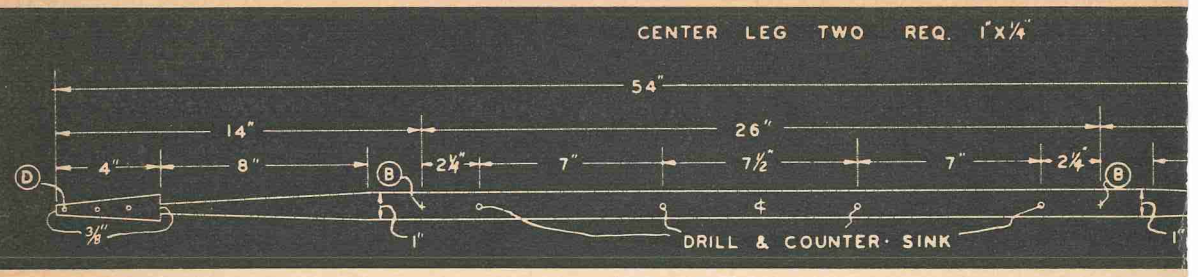


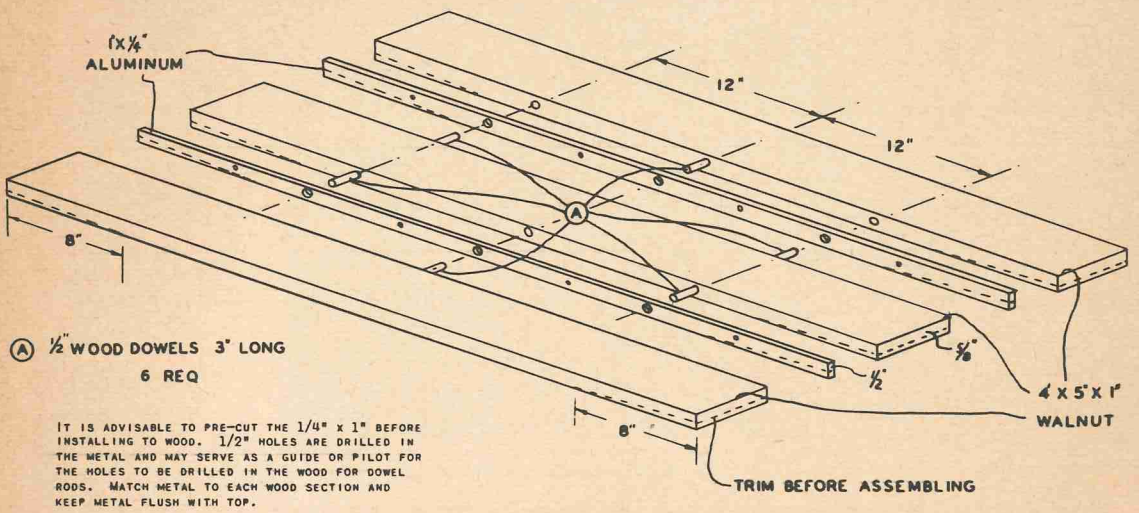
Detail photos show end construction of table top and method of foot assembly.









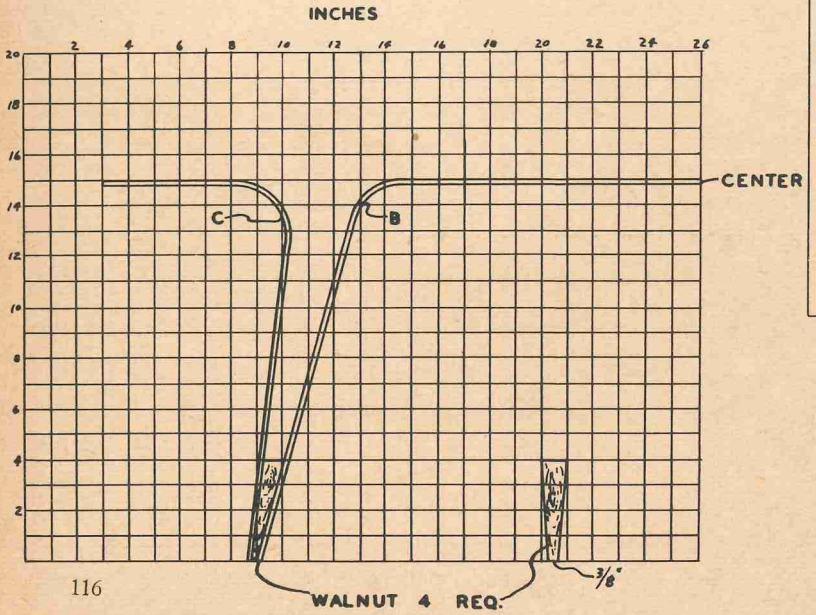


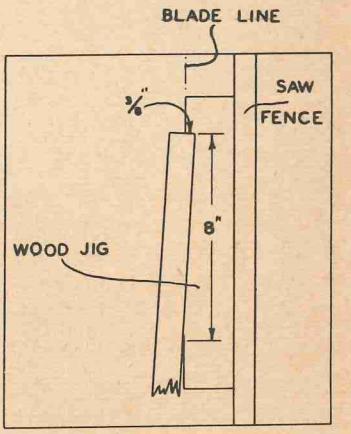
Ⓐ ½" WOOD DOWELS 3" LONG
6 REQ

IT IS ADVISABLE TO PRE-CUT THE 1/4" x 1" BEFORE INSTALLING TO WOOD. 1/2" HOLES ARE DRILLED IN THE METAL AND MAY SERVE AS A GUIDE OR PILOT FOR THE HOLES TO BE DRILLED IN THE WOOD FOR DOWEL RODS. MATCH METAL TO EACH WOOD SECTION AND KEEP METAL FLUSH WITH TOP.

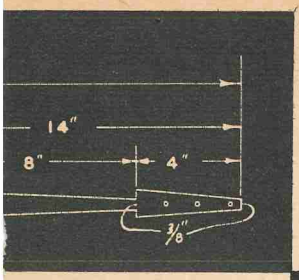
SAND OR ROUGHEN SIDES OF ALUMINUM BAR BEFORE GLUING.

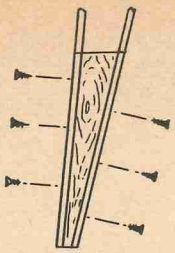
A ROUGH CUT CAN BE MADE ON THE BOTTOM OF THE TABLE TOP MEMBERS USING A CIRCULAR SAW. THIS WILL ELIMINATE A GREAT DEAL OF PLANING. THIS MAY ALSO BE DONE ON A BAND SAW. THE METHOD SHOWN IS FOR AN 8" CIRCULAR SAW.

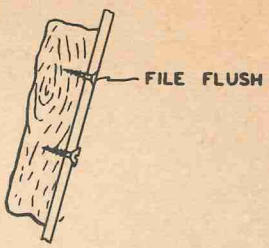


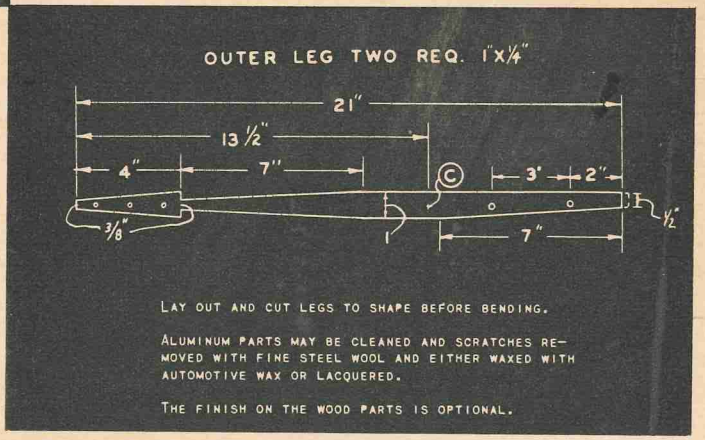


BOTH JIG AND WORK IS FED THROUGH SAW AT SAME TIME. THE JIG RIDES AGAINST THE FENCE.
MOST 8" SAWS WILL CUT ONLY HALF WAY THROUGH THE 5" WOOD. IT WILL BE NECESSARY TO MOVE FENCE TO LEFT OF BLADE AND REVERSE JIG TO COMPLETE CUT.
THE CONTOUR OF THE TOP IS FINISHED AFTER ASSEMBLY AND MAY BE DONE WITH PLANES OR PORTABLE BELT SANDER.









ever thinness is desired at both ends, as shown in the illustrations. Use either a band saw or a circular saw for this work. A hand plane can be used but takes more time and muscle. If using a circular saw, the use of a simple jig, as shown in the detail drawing, will insure accuracy and your board ends will be shaped evenly.

Prepare the aluminum inserts next. Saw the ends to taper them to the shape of the board ends. Lay out and drill three ½-inch dowel holes in each aluminum strip. You can use one of the drilled strips as a guide to mark the position of the dowel holes in each board. The dowels to be used are only three inches long, so the holes need be no more than 1½ inches deep. Before doweling and gluing the table top together, roughen the sides of the aluminum strips with sandpaper or coarse steel wool to give the glue more gripping surface.

After the top has been doweled and glued, lay out the curves or arcs which give the ends of the table its very modern look. You can draw these arcs with either a string and pencil or trammel points. A paper template can be cut, too, and outlined on the wood surface. Saw carefully just outside the lines drawn; use a hand plane to finish.

THE LEGS

Each table leg is made from two pieces of aluminum, with a walnut insert for a foot. Two of the inside legs, the longer pieces, can be made from one strip of aluminum. Tape two strips of aluminum together and cut both sets of inside legs at the same time. Mark the feet and tapered sections carefully. Then, after marking, saw them out on a jig saw, or use a coping saw. The tapered section of each leg is only eight inches long. A file can be used to dress off the edges; smooth and square before using steel wool. Remember to use a single-cut file when working on aluminum. Keep the teeth of the file clean.

Form the legs next, bending them over a curved block of wood or around a dowel rod, or even a length of pipe held in a vise.

The screw holes can be drilled last. Use a countersink drill or a large twist drill for countersinking the screw heads.

The walnut feet must be shaped exactly before being inserted and marked for pilot holes. Be sure to drill all pilot holes as large as the core of the screws to be used.

Rub the aluminum parts with fine steel wool to give them a uniformly bright finish. The walnut can be darkened with oil or an oil stain before being shellacked, varnished or lacquered. •

Inlaid Walnut Coffee Table

By Robert W. Arehart

It's the extra touches that give this knee-high coffee table its fine-quality, custom appearance.

Designed by Robert W. Arehart

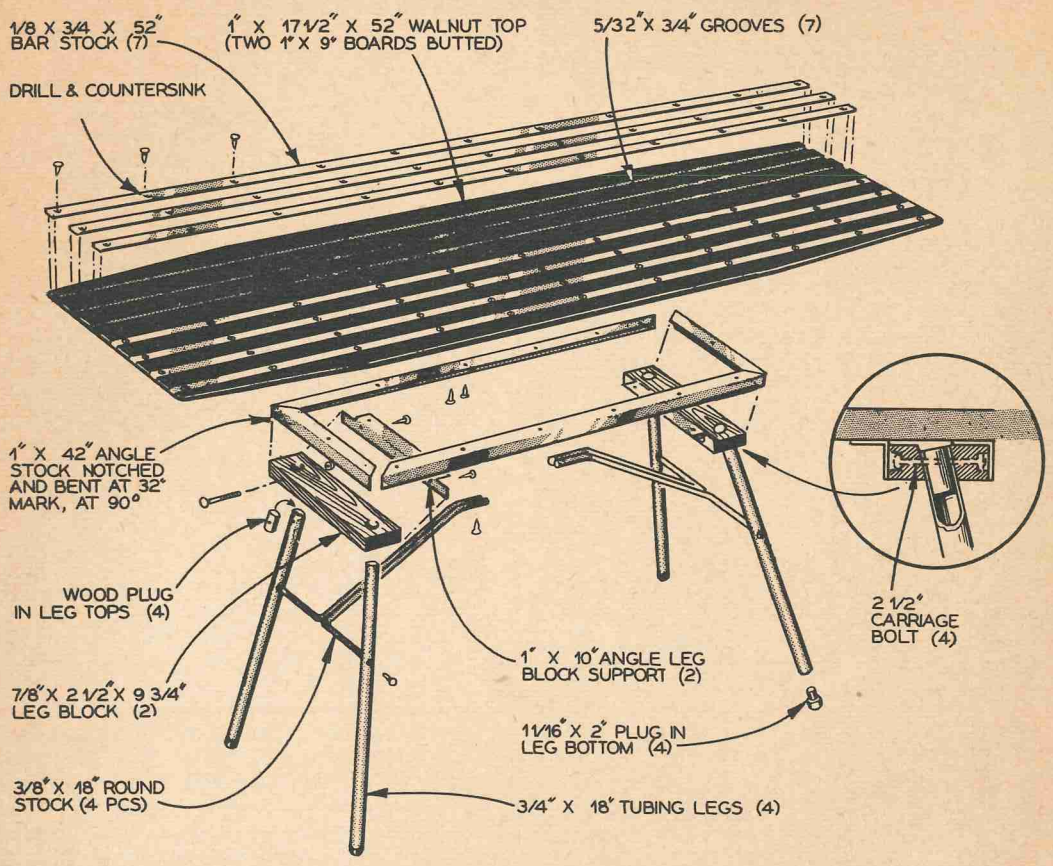
SELECT two pieces of clear-grain walnut (1 x 9 x 52 inches) and join using preferred glue joint to form the table top. Using a da-do blade, cut seven grooves, ¾ inch wide, $\frac{5}{32}$ inch deep, and 1½ inches apart in the top surface. Make a paper pattern and mark the outline of the top on the wood and cut to shape. Caution must be exercised when shaping the top. It is good practice to cut slightly oversize so that any mechanical errors may be compensated for later when the final hand-shaping and sanding is to be done.

Using Do-It-Yourself Aluminum bar stock, ⅛ x ¾ inch, cut seven pieces ¼ inch over length. Stack these pieces and bind together with tape on the ends and in about three equally spaced spots along the length. Starting 1⅛ inches from the end, use a center punch to mark the top bar every five inches for screw holes. Drill all seven bars at once at positions marked on the top bar using a $\frac{3}{16}$-inch metal bit. This method applies only when a drill press is available. If an electric hand drill is to be used, each of the seven pieces must be marked and drilled separately. The next operation is to countersink each hole for a flat-head screw $\frac{3}{16}$ inch in diameter. Care must be exhibited in countersinking so that the screw head is exactly flush.

Place the bars in the grooves; they will be $\frac{1}{32}$ inch below the surface of the wood. Line up all screw positioning holes by sliding bars to one end or the other. If holes have been carefully drilled, ⅛ inch of bar should extend beyond each end of the wood surface. This is to be removed at a later finishing step.

Drive ⅜-inch brass screws flush with top of bars and position screw slots perpendicular to the length of the bars. Using a good flux fill screw slots with solder.

The under-frame is made from two pieces of 1-inch aluminum angle stock. The two pieces are L-shaped; the Ls are put together to form a rectangle. Keep in mind that a right and a left L must be made. Forty-five-degree miters are made at the



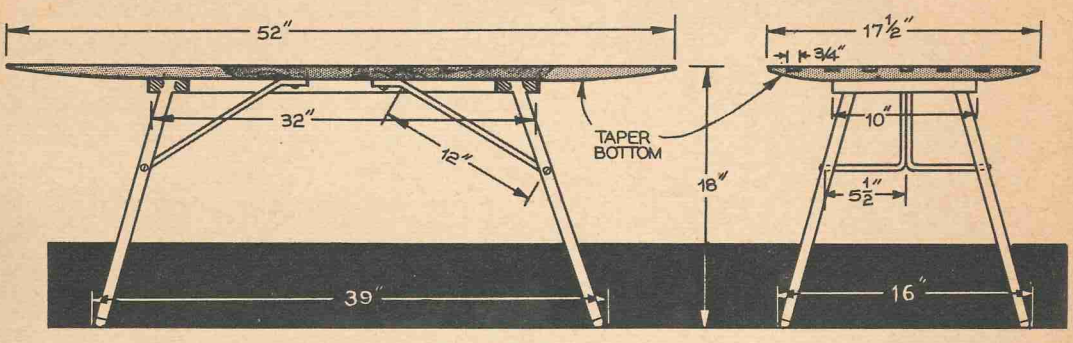
ends of the L-sections and a 90° notch is cut for forming the corner of each L.

Clamp the angle stock to a work surface and, at a point ⅛ inch from the end, cut a 45° miter with a hacksaw. At a point 32 inches from the vertex of the miter, drill a ⅛-inch hole next to the outside wall of the angle stock. From the limits of the hole, mark and cut a 90° notch. Ten inches from this point cut another inside 45° miter. Clamp the uncut surface of the angle stock to the top of the work surface with the cut wall over the edge and the 90° notch next to the corner of the work surface. Bend the extended piece down slowly until a right angle is formed. Using the same procedure, form the other L to complete the rectangle.

Using ¾-inch tubing, cut four 18-inch lengths for legs. Make plugs for the top ends of the tubing out of soft pine turned down to the inside dimensions of the tubing. Drive a plug into each leg until it is flush with the end of the tubing. At a point six inches from this end, drill a ⅜-inch hole in each leg, through one wall of the tubing only.

To form the T-braces, cut four pieces of ⅜-inch round stock to size. In one end drill and tap a 4-40 hole to a depth of ¾ inch. At a point 5½ inches from the drilled end make a right-angle bend, forming an L. Lay two of the L-shaped pieces together to form a T. At points two and eight inches from the top of the T, drill and rivet.

Using two pieces of ⅞-inch plywood for leg blocks, center for ¾-inch leg holes 1¼ inches from each end and one inch in from



the side. Drill holes for the legs at a 70° angle from the side and end. Fit the tubing, with plugged ends, in the ¾-inch holes. Line up the ⅜-inch holes in each pair of legs to face each other. Drill and countersink the leg blocks for ¼-inch bolts and nuts on the 1¼-inch center line, as shown in the detail drawing. The bolt will penetrate the plywood and plugged tubing. Insert bolt and secure with nut and washer.

Place the shouldered ends of the T-brace in the ⅜-inch holes of each pair of legs and secure by machine screws.

Starting from the corners of the frame, drill $\frac{3}{16}$-inch holes two inches apart in the surface to be attached to the table top. Square up the frame, then place leg-holder in the frame. Drive screws from the top of the frame into the leg-holder. This will hold the frame together and secure the leg-holder to the frame. On the corners of the frame where the miter cuts are open, fill with body solder or an aluminum paste filler such as Sculp Metal. File smooth.

To cover the exposed edge of the leg-holder in the frame, cut a piece of 1-inch angle stock and notch for the sides of the frame. Starting one inch from each end, drill $\frac{3}{16}$-inch holes on both surfaces of the angle on center. Fasten to leg-holder with screws, notched side of angle down.

Place frame leg-assembly on bottom of table top and mark location for final assembly. Take care in marking location of screw heads used in fastening leg-holder to frame. Drill ½ inch by ¼ inch deep at these positions in bottom of table top.

Bring end of T-brace to bottom of table top. File end at an angle to make surface flush with table bottom. Drill $\frac{3}{16}$-inch hole in each ⅜-inch portion of brace to facilitate screw-fastening to table top.

From location of frame marked on bottom of table top, taper bottom ends with hand plane to ¼ inch thickness at edge. Break corners with sanding block.

Using a power sander, sand down the table top until a flush surface is obtained. At this time finish shaping and sanding the bottom.

Insert walnut leg plugs in leg tubing. Rub down all metal surfaces with fine steel wool.

All parts of the table should be wiped down with a clean cloth. All metal surfaces in the frame should be waxed with paste wax or sprayed with clear, non-gloss metal lacquer to prevent oxidation.

The leg-holder should be finished with a walnut stain. The table top should be sprayed with two coats of sanding sealer on all surfaces and then sanded with fine-grit sandpaper. Spray the table top with as many coats of clear lacquer as personally desired for a smooth finish, carefully working down with wet-dry paper and oleum. Rub down final coat with rubbing compound in a felt pad. Use paste wax for final finish.

Place frame leg-assembly on bottom of table top and fasten with ½-inch-long round-head screws through previously drilled $\frac{3}{16}$-inch holes in frame and $\frac{3}{16}$-inch holes in T-braces. •

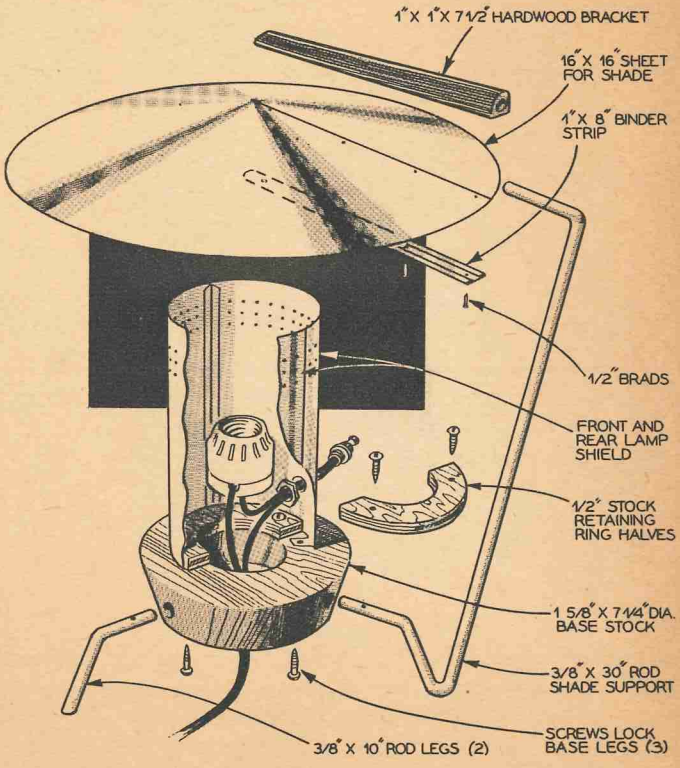
Table Lamp

Whether beginner or experienced craftsman, you'll find the making of this lamp a worth-while and wholly satisfactory experience.

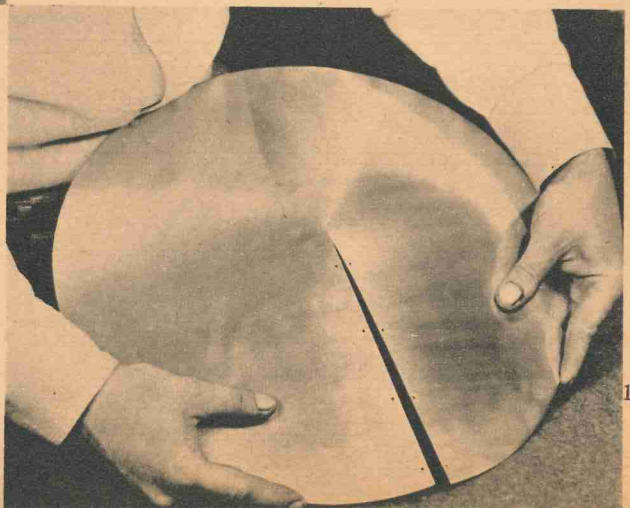
HERE'S an easy-to-make project which represents the last word in modernity. Three kinds of material have been integrated successfully in the design of this table lamp: wood, metal, and electrical wiring. Whether you are a beginner or an experienced craftsman, you'll find the combining of wood, wire, and this new do-it-yourself aluminum a worth-while and interesting experience.

You can start with either the wood or the metal. The electrical work has to come

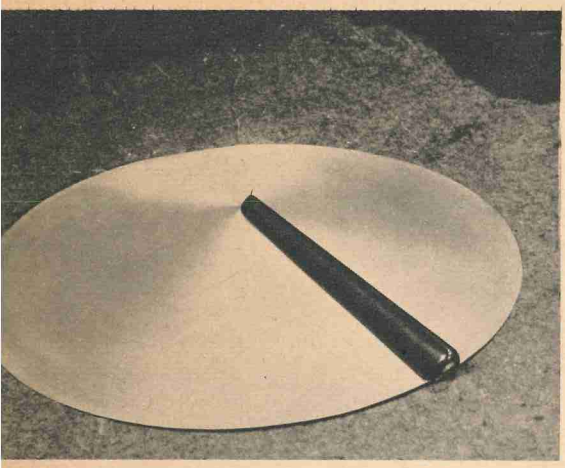
last, of course. Regardless of which material you plan to start with, first take a good gander at the photographs and detail drawings presented here. As you will see by the drawings and photos, the two parts of the metal shield which form the lamp body can be either lapped or joined by a cleat. Use whatever method best suits you. Changes in size and proportion can be made easily to make the lamp either larger or smaller than shown. Adherence to the general proportions suggested, however, should give you a pleasing and more than satisfactory lamp.



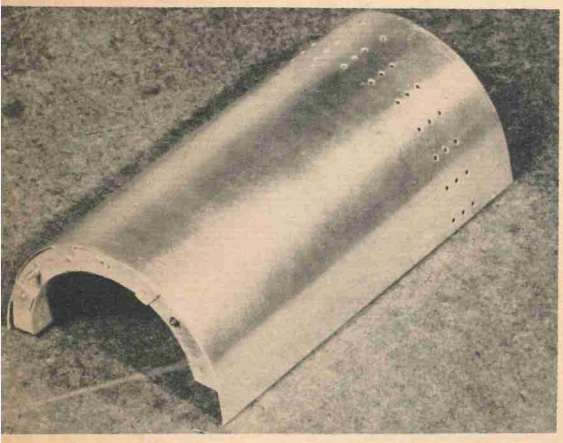
The shade is made from a large aluminum disc. Cut out wedge; bring edges together to shape.



Bracket is attached to shade by brads; bore hole for metal support arm before attaching to shade.



Use comparable size tin can as jig to facilitate forming half-sections of cylindrical lamp shield.



With lamp shield section properly rolled, bend down tabs and attach to plywood retaining ring.

LAMP SHADE

You can lay out this large circle with the aid of two nails joined by a length of string. Adjust the string for the desired radius, then, holding one nail firmly at the center of your aluminum, scribe a full circle with the point of the other nail, keeping the string taut. Next outline the wedge-shaped section to be cut away. Remember, when cutting the lamp shade to shape, to cut back in the jaws of your shears or tinsnips, not with the points. This will give you a smooth, unwrinkled edge. Lay out and drill your brad holes last.

Draw, cut, and form your shade binder next. Form the hemmed edges over the sharp edge of a board. Drill brad holes in the binder to match those in the shade.

The shade may be finished in a variety of ways. If a spun finish is desired, cement the aluminum disc to a plywood disc with rubber cement and attach to the face plate of a rotary unit. Hold block wrapped with medium-grit sandpaper against the aluminum and work from the center to the edge with slow, even strokes. Do this before cutting out the wedge-shaped section.

LAMP SHIELD

Draw and cut out these two pieces before laying out the drilled perforations. Then form the hemmed edges, if the two sections are to be joined by cleats, and drill the perforations as well as the screw holes at the bottom of the shield. To facilitate shaping the shield, scout around for a tin can of the approximate desired shape of the finished shield and use it as a jig.

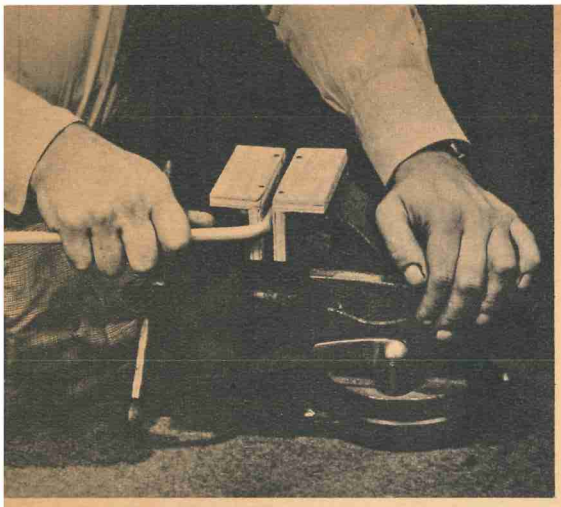
LEGS AND SHADE SUPPORT

These parts are easily formed from ⅜-inch aluminum rod. You can use any kind of a bending jig, or, as shown in the photo, two heavy screws placed two inches apart in a metal vise. Before making the sharp bend in the shade support, heat the rod slightly with a blow torch, or hold it over a gas flame. A bunsen burner will also do the trick.

Before drilling the screw holes in the legs, for attachment to the base, center-punch them carefully.

The feet must be filed so they will rest flat on a horizontal surface. Rubber tips can also be purchased for the leg ends, if desired.

Plywood retaining rings and shield sections are in turn attached by screws to turned lamp base.



To form aluminum rod legs and shade support arm, secure section of rod in vise and bend to shape.

Rod can also be shaped by spacing heavy screws between the jaws of a metal vise to make a jig.

With aluminum rod legs properly shaped, insert in lamp base and secure by countersunk screws.

BASE

The hardwood base (maple, walnut, or birch) can be shaped in a number of ways. If you have a lathe, you can mount the wood block on a face plate and cut the inside recess as well as shape the outside in a few minutes. The base can also be made in two parts, cut with a jig saw or coping saw, and then glued together. Of course this will require more filing and sanding to secure the desired shape and finish.

Drill the holes in the base for the legs and wiring last. Mark these accurately before drilling. The center hole is the cord exit.

SHADE BRACKET

The bracket is made from 1 x 1-inch stock and should match the wood used in the base of the lamp, at least so far as grain and coloring are concerned. Mark and drill the hole for the metal support arm first. Then shape the bracket with a block plane, spoke shave, or pocket knife. Prepare for finishing with sandpaper and steel wool.

RETAINING RINGS

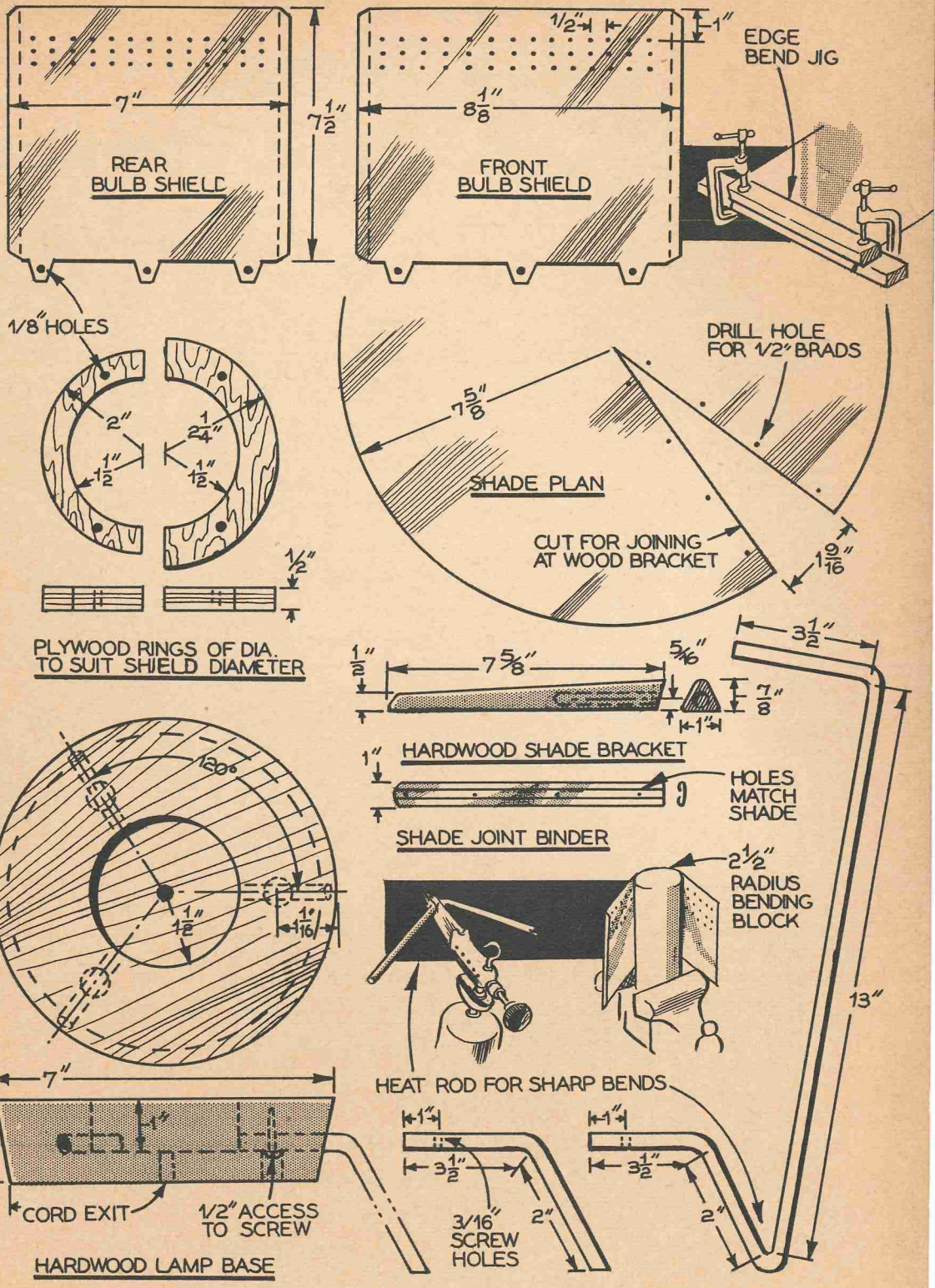
These rings can be made from plywood of any thickness above ¼ inch. Draw first on paper. Make templates to match the recess in the base. The outside diameter, of course, must match the shape of the shield sections which will be fastened around them. When cutting, be sure to take into consideration method by which shield sections are to be joined. Use a jig or coping saw to cut out the rings. Screw the shield sections to the rings before fastening the rings to the base. Drill pilot holes in the base before inserting the screws.

WIRING THE LAMP

This lamp presents no special wiring problems. Wire it as you would any lamp. Clean your wires and connect them to the socket before screwing the socket into place. Then insert your switch and screw on the lock nut which holds it in position. Lastly screw on your retaining ring.

FINISHING

To prevent finger marking of the aluminum, apply a thin coat of clear lacquer or wax. Finish wood parts with lacquer or varnish, or stain or enamel as desired. •


REAR BULB SHIELD
7"
7 1/2"
FRONT BULB SHIELD
8 1/8"
1/2"
1"
EDGE BEND JIG
1/8" HOLES
2"
2 1/4"
1 1/2"
1 1/2"
1/2"
PLYWOOD RINGS OF DIA. TO SUIT SHIELD DIAMETER
DRILL HOLE FOR 1/2" BRADS
7 5/8"
SHADE PLAN
CUT FOR JOINING AT WOOD BRACKET
1 9/16"
1/2"
7 5/8"
5/16"
7/8"
1"
3 1/2"
HARDWOOD SHADE BRACKET
HOLES MATCH SHADE
SHADE JOINT BINDER
120°
1 1/2"
1 1/16"
2 1/2" RADIUS BENDING BLOCK
13"
HEAT ROD FOR SHARP BENDS
7"
1 5/8"
1"
5/16"
CORD EXIT
1/2" ACCESS TO SCREW
HARDWOOD LAMP BASE
3 1/2"
3/16" SCREW HOLES
2"
2"


fashion
for two

Floor Lamp

Here's a lamp with a lot of style! And it's quite easy to build: requiring only a little wood-turning, some simple aluminum work, and elementary wiring.

THIS smart, cleverly attractive lamp is a very worth-while home workshop project. Making it involves a little wood-turning on a lathe, some simple sheet-metal work, rod bending, and elementary electrical wiring.

The four wooden parts can be made of a good hardwood, finished with a french polish on the lathe, or of cheaper stock finished with dark stain or paint.

The aluminum rods are easy and even fun to bend. They can be finished nicely, too, with ordinary steel wool.

The shade and lamp shields are made of plain aluminum sheeting and can be finished in a variety of ways. See the section of this book dealing with finishes for detailed information.

LAMP SHADE

The shade, with its 12-inch radius, can be laid out with the aid of two nails and a length of string. Adjust the string for the desired radius, then, holding one nail firmly at the center of your aluminum, scribe a full circle with the other nail, keeping the string taut. Draw the wedge-shaped cut-out and mark the $\frac{3}{16}$-inch seams before going to work with your shears or tinsnips. Cut back in the jaws of your snips, not with the points, to achieve a smooth, unwrinkled edge. The seams can be formed by bending the $\frac{3}{16}$-inch flaps over the sharp edge of a board. Remember that one edge is bent up and one bent down, and then the two are locked together. A number of light dimples, made with centerpunch or nail, will keep the seam from loosening and slipping apart.

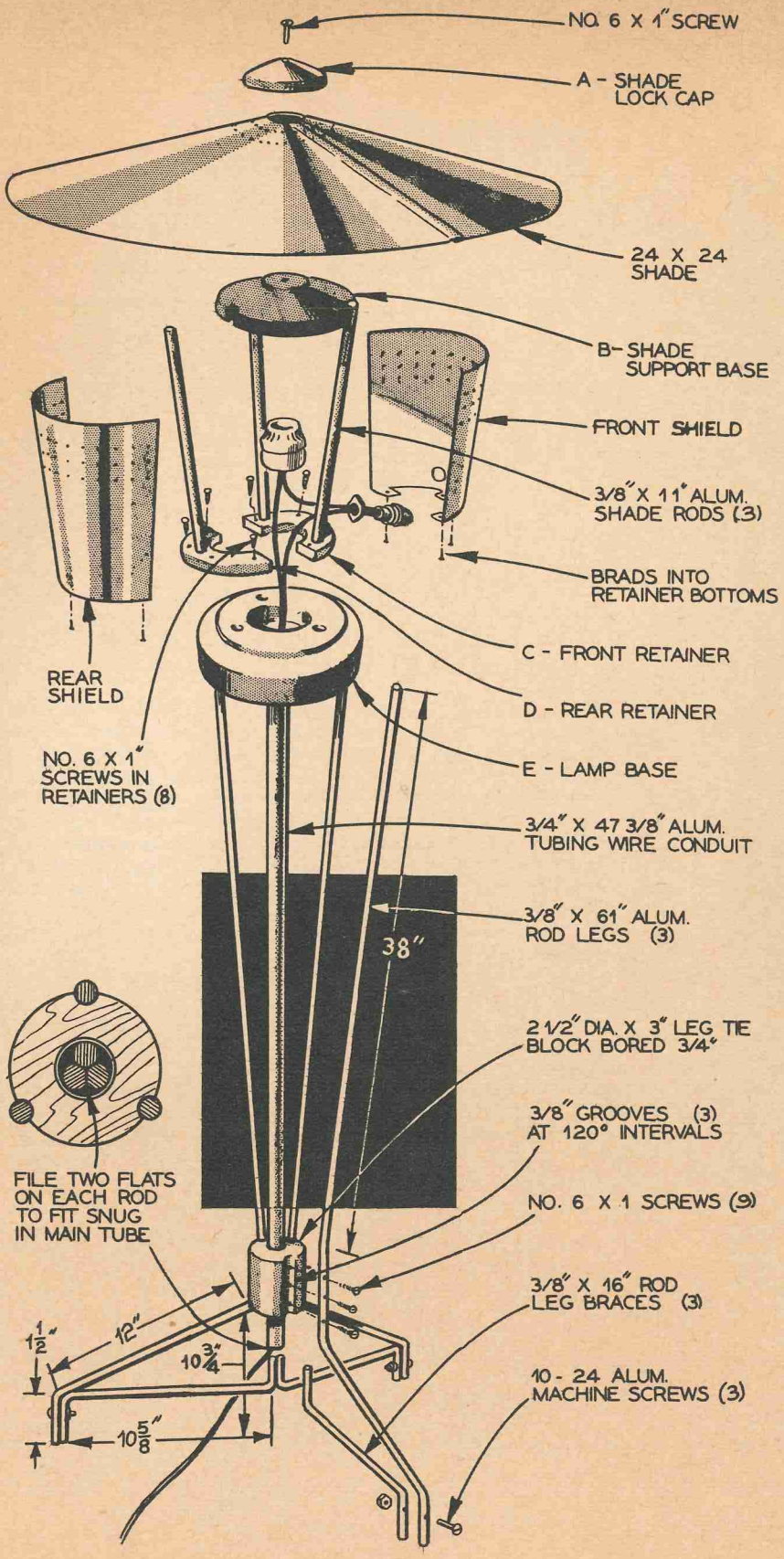
LAMP SHIELD

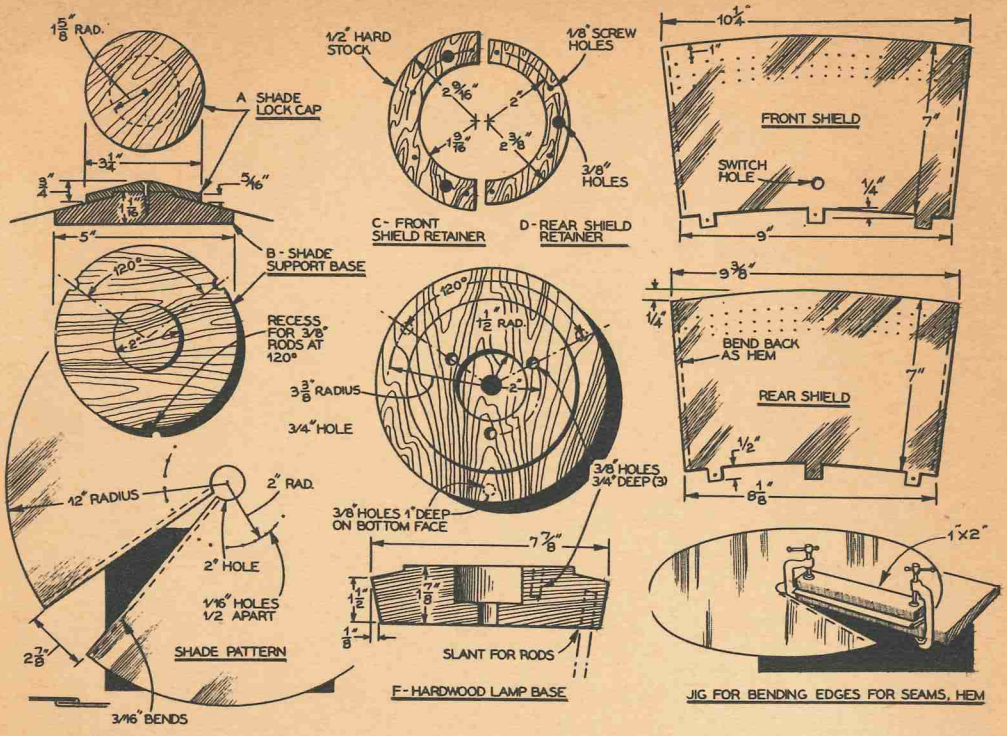
It would be wise to make paper templates of your shield sections first. Notice that the shields are cone shaped; larger at the top than at the bottom. After outlining your front and rear shields on a plain sheet of aluminum, cut out. Then mark the locations of the perforations. In the process of drilling the perforations small burrs may form on the edges of the holes. Remove these carefully (without scratching the aluminum) with a small file, or use a piece of emery cloth. Remove any emery cloth marks with fine steel wool.

LEGS AND BRACES

The legs and braces are of $\frac{3}{8}$-inch aluminum rod. These pieces can be formed cold in a vise, if they are formed slowly and only once. Too much bending will harden the metal and make it brittle. Do not use hard hammers or mallets on the rod. Marks made by such tools are often difficult to remove. A better method is to heat the rod slightly with a blowtorch at the point of bend and form it with your hands. Use a paper template or full-size sketch to secure the same degree of bend on each leg or brace.

Be sure to assemble the legs and braces before marking and centerpunching for machine-screw holes. Notice also that the ends


NO. 6 X 1" SCREW
A - SHADE LOCK CAP
24 X 24 SHADE
B- SHADE SUPPORT BASE
FRONT SHIELD
3/8" X 11" ALUM. SHADE RODS (3)
BRADS INTO RETAINER BOTTOMS
C - FRONT RETAINER
D - REAR RETAINER
E - LAMP BASE
REAR SHIELD
NO. 6 X 1" SCREWS IN RETAINERS (8)
3/4" X 47 3/8" ALUM. TUBING WIRE CONDUIT
3/8" X 61" ALUM. ROD LEGS (3)
38"
2 1/2" DIA. X 3" LEG TIE BLOCK BORED 3/4"
3/8" GROOVES (3) AT 120° INTERVALS
FILE TWO FLATS ON EACH ROD TO FIT SNUG IN MAIN TUBE
NO. 6 X 1 SCREWS (9)
3/8" X 16" ROD LEG BRACES (3)
10 - 24 ALUM. MACHINE SCREWS (3)
1 1/2"
12"
10 3/4"
10 5/8"



of the braces have been filed for a snug fit in the center tube. Consult the detail drawing for exact filing guidance.

CENTER TUBE

The center tube is a straight piece of ¾-inch aluminum tubing. Handle it carefully to avoid nicking or scratching. It can be finished with fine steel wool.

SHADE CAP

The wood shade cap can be made from ¾-inch stock, cut out with a coping saw, and then planed and filed to a cone shape. The inside can be drilled and chiseled to the proper measurements.

An easier method, of course, is to turn this piece (as well as the lamp base and leg-tie) on a lathe. Fasten your cap stock on a face-plate and turn the bottom side first. Then reverse the cap on a turning block and turn the top side. Finally, drill and countersink the centerhole.

SHADE SUPPORT BASE

This is a simple piece to make on a lathe. First, however, drill the three peripheral holes for the ⅜-inch shade rods. Then fasten the stock to a face-plate and turn to the proper measurements on a lathe.

LAMP BASE

This piece is also made on a lathe. Screw your stock to the face-plate and turn to size. After removing from the face-plate check it against the drawings for the correct leg-hole locations. Then mark and drill the piece.

TIE BLOCK

Locate and drill the three ⅜-inch holes first. Then mount the stock on a face-plate and turn to the correct size. The ¾-inch-diameter hole in the center should be drilled after turning.

SHIELD RETAINING RINGS

Make paper templates of these two pieces first. Check the templates for accuracy by holding them in position on the lamp base. Cut the wooden rings from ½-inch plywood and drill all holes after consulting detail drawings.

WIRING THE LAMP

This is a simple wiring job. Just remember to drop your lamp cord through the ¾-inch aluminum tube before finally inserting the leg braces at the bottom. Then proceed to wire the lamp as shown in the drawings. •

Artist's Drawing Table

By Tom Mills

This sleekly modern desk, designed primarily for use by an artist, can be made with or without the adjustable, drawing-board top.

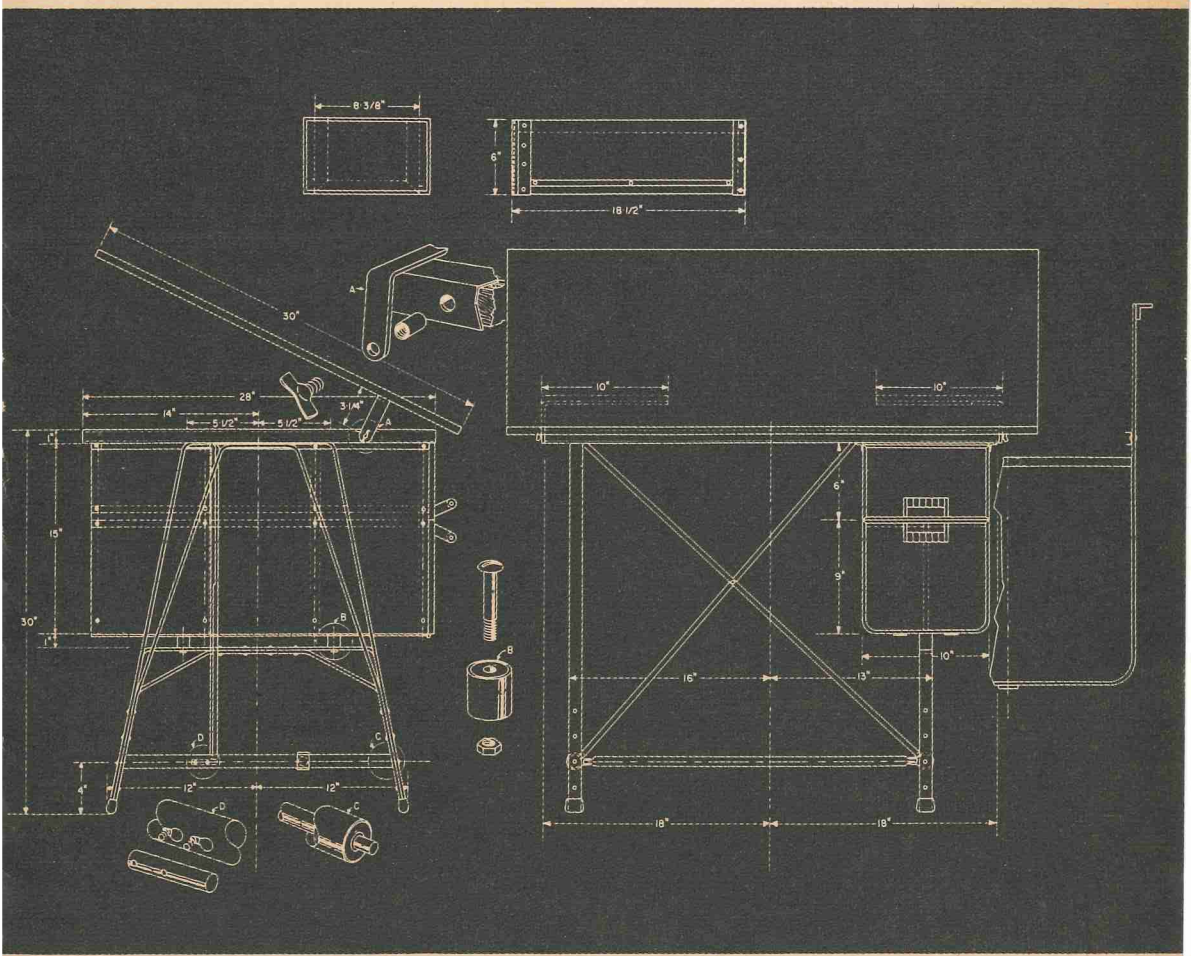
Designed and built by Tom Mills of Palma-Knapp Associates, Chicago

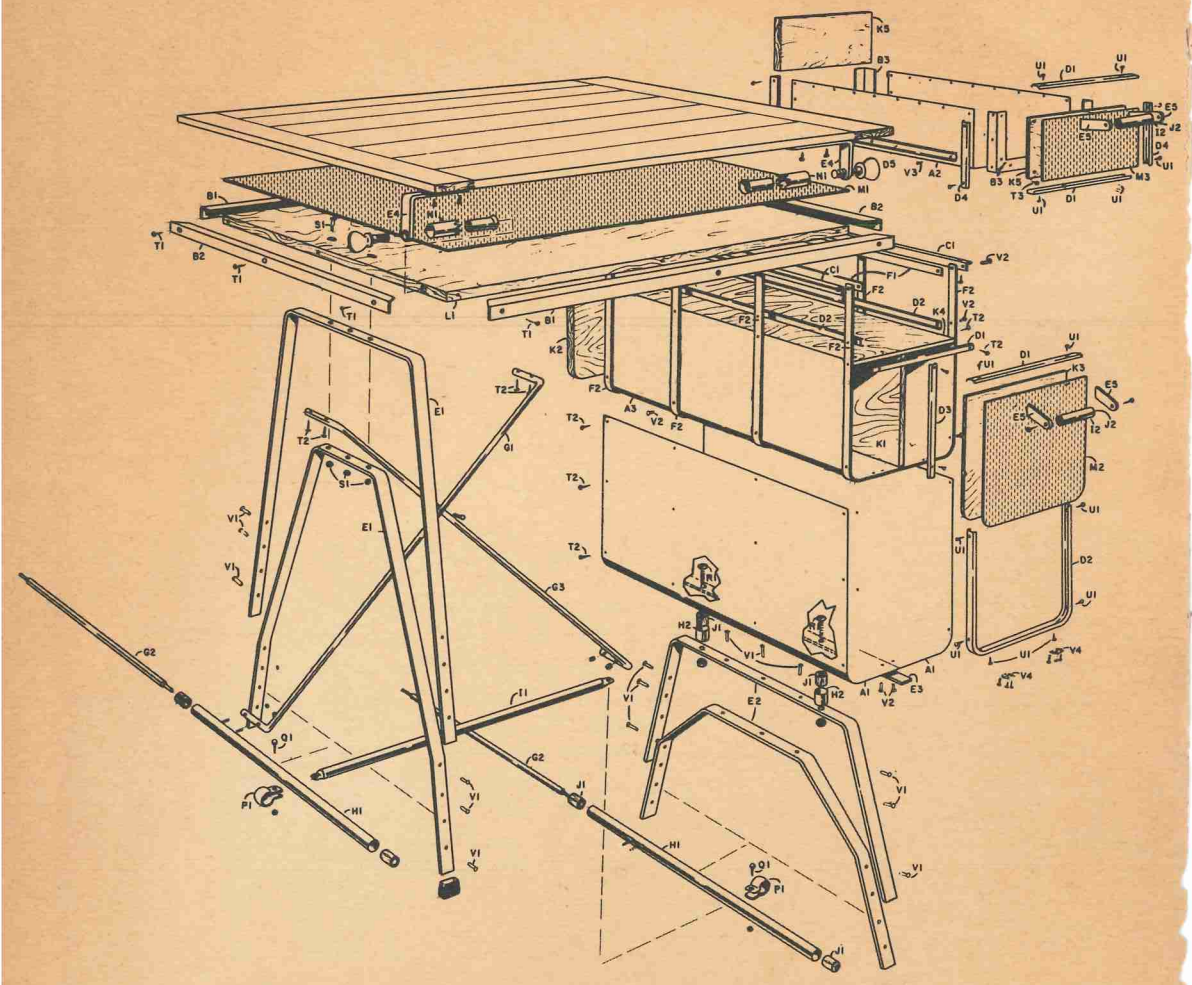
SLEEKLY modern, this drawing table may seem a little complicated for the beginner, but with a little patient study of the drawings, the table pictured can easily be duplicated. If desired, the table can be constructed without the addition of the tilt top, giving you a very serviceable and very modern work table or desk, with lots of drawer space.

DRAWER AND DRAWER CASE

Cut all pieces to sizes specified in bill of materials and identified on the exploded view. Bend drawer case ribs (F2), using a 2-inch-radius jig for bottom corners. Drill holes in ribs to receive rivets and screws. Roll inner drawer case shell (A3). Since sheet aluminum does not come any larger than 36 x 36 inches, the outer shell (A1) has to be made in two sections. Assemble and clamp together with C-clamps. Rivet the bottom of the outer shell first, drilling and riveting as you go, because the metal may stretch slightly. Rivets will have to be trimmed according to the thickness of the materials to be joined. Make sure every rivet is driven tight. Add channels (D2), angles (C1), and braces (F1) while riveting the parts of the drawer case together.

After riveting the metal parts together, cut wood parts to size and screw in place.





Cut channels (D1) and (D3) to size and attach with wood screws.

Cut and shape all parts of top, sliding drawer. Shell edges should be turned and reinforced with 1/8 x 3/4-inch bar stock. Drawer-end angles (B3) are formed by drilling and cutting 90° wedges at points where bends are to be made, after which angle is easily bent to shape. The holes in this assembly should all be drilled before you start to rivet. The drawer-front parts, (M3) and (K5), are glued together after being cut to size. Add aluminum channel edging, with corners mitered. The handle arms are cut from 1 x 1/4-inch bar stock and tapered to a 3/4-inch half-circle on one end to fit 3/4-inch tubing. Drill holes and screw into 5/8-inch wood dowel inserted into tube handle.

LEG ASSEMBLY

Draw full-size patterns on wrapping paper and bend all aluminum parts to shape. Clamp together, drill and rivet before trimming feet. The cross pieces (H1) are assembled as shown in the exploded view. The 3/8-inch center rods (G2) are formed at both ends to act as rivets. Countersink rivet holes in legs so that the 3/8-inch rod can be filed flush after peening. Cut keyslots in tubing (H1) to receive bolts for attaching cross braces (G1) and (G3).

DESCRIPTION OF MATERIALS

	QUAN.	SIZE (IN INCHES)	IDENT.
ALUMINUM, SHEET	2	20 x27	A1
	1	20⅜x18	A2
	1	28 x27	A3
ANGLE, 1 x 1 x 1/16	2	36	B1
	2	28	B2
	2	22	B3
ANGLE, ¾ x ¾ x ⅛	2	28	C1
CHANNEL, 9/16	4	10	D1
	3	28	D2
	1	9	D3
	2	6	D4
	2	16	D5
BAR, 1x¼	2	70	E1
	2	47	E2
	1	28	E3
	2	14	E4
	4	2½	E5
BAR, ¾x⅛	2	28	F1
	4	40	F2
ROD, ⅜	1	46	G1
	2	22¾	G2
	1	37	G3
TUBE, 1 O.D. x .049	2	21½	H1
	2	1	H2
TUBE, ¾ O.D. x .049	1	27	I1
	2	3	I2
WOOD DOWEL ⅞	6	1	J1
	2	3	J2
PLYWOOD, ⅜	1	27 x 8⅝	K1
	1	10 x 8⅝	K2
	1	10 x 8⅝	K3
	1	27 x10	K4
	2	6 x 8⅜	K5
PLYWOOD, ¾	1	27⅞x35⅞	L1
CONGOLEUM, ⅛	1	27⅞x35⅞	M1
	1	10 x 9	M2
	1	10 x 6	M3
OCTOPUS T-NUT & WING BOLT	2		N1
PIPE CLAMP	2	1	P1
HX. HD. MACHINE SCREW & NUT	2	3/16x ¾	Q1
RD. HD. STOVE BOLT & NUT	2	¼x 2	R1
FLAT HD. STOVE BOLT & NUT	3	¼x 1½	S1
FLAT HD. WOOD SCREWS	12	1½ No. 6	T1
	18	¾ No. 6	T2
	6	⅜ No. 6	T3
FLAT HD. BRADS	16	½	U1
ALUMINUM RIVETS	15	⅛x ¾	V1
	15	⅛x ⅜	V2
	24	3/32x ¼	V3
HINGE	2	¾	V4

Foot rest is made as shown so that it can be adjusted for comfort.

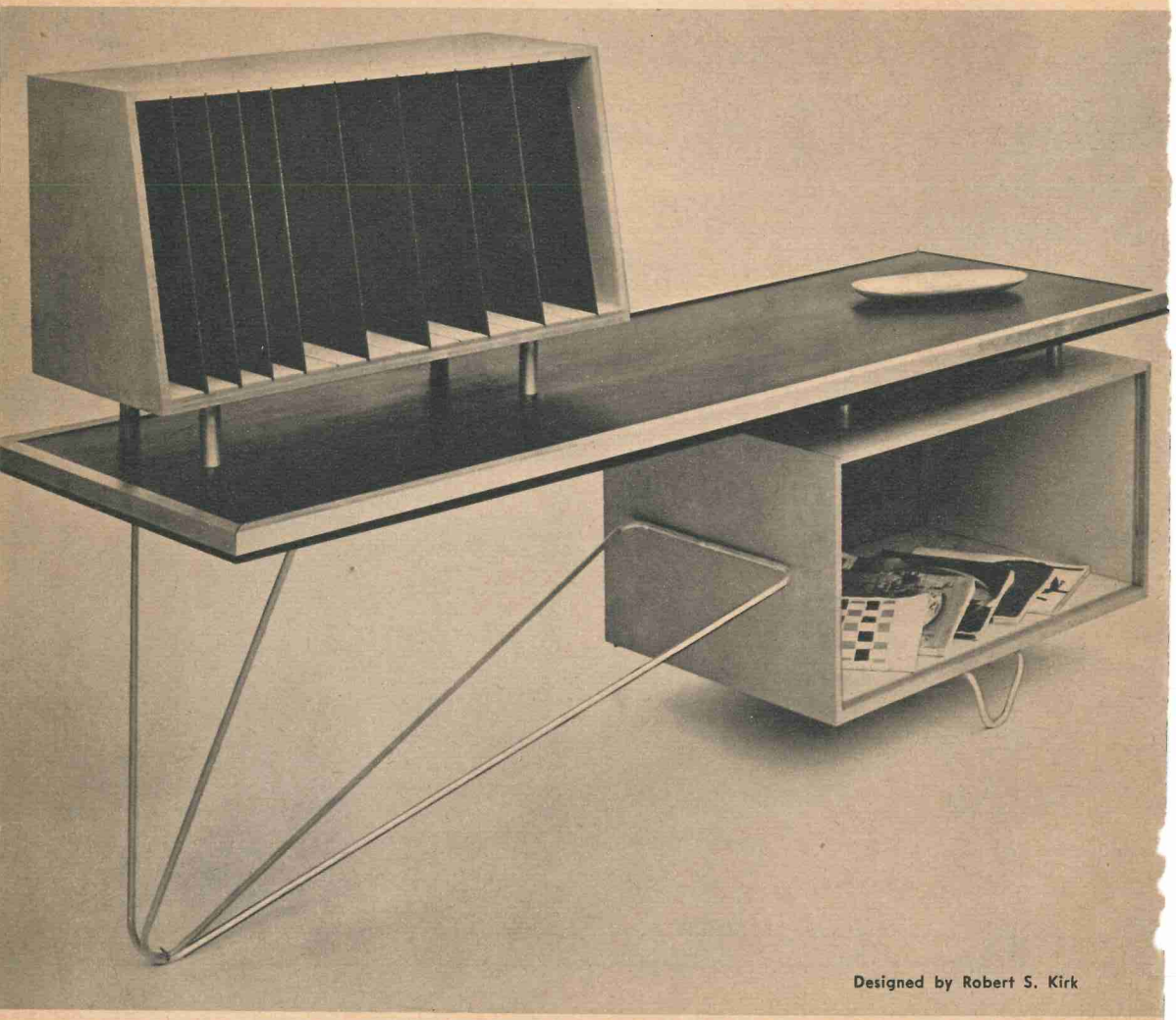
TOP ASSEMBLY

Cut parts to size. Miter aluminum angles (B1) and (B2); drill three holes in each length for attachment to table top and countersink each. Countersink three holes in plywood top (L1) to receive bolts (S1) for left leg assembly. Glue Congoleum top (M1) in place, then add 1-inch angle trim. Drill holes to receive Octopus furniture T-nuts and wing bolts (N1). Turn top upside down and attach drawer case by screws placed through drawer-case angles (C1) and into top. Drill ¼-inch holes into bottom of drawer case to receive right leg assembly. After legs are in place, cut rod braces (G1) and (G3) to fit and attach. Add foot rest with pipe clamps. A piece of rubber may have to be placed between clamp and tube (H1).

The bottom door of the drawer case should now be assembled and hinged in place. Add aluminum bar angles (E4) to a standard 30 x 42-inch drawing board and fit to T-nuts. Tilting table top may be further supported with adjustable brackets.

No finishing is necessary. If desired, a brushed finish may be obtained by rubbing aluminum lightly with fine finishing sandpaper or steel wool. •

File Desk



Designed by Robert S. Kirk

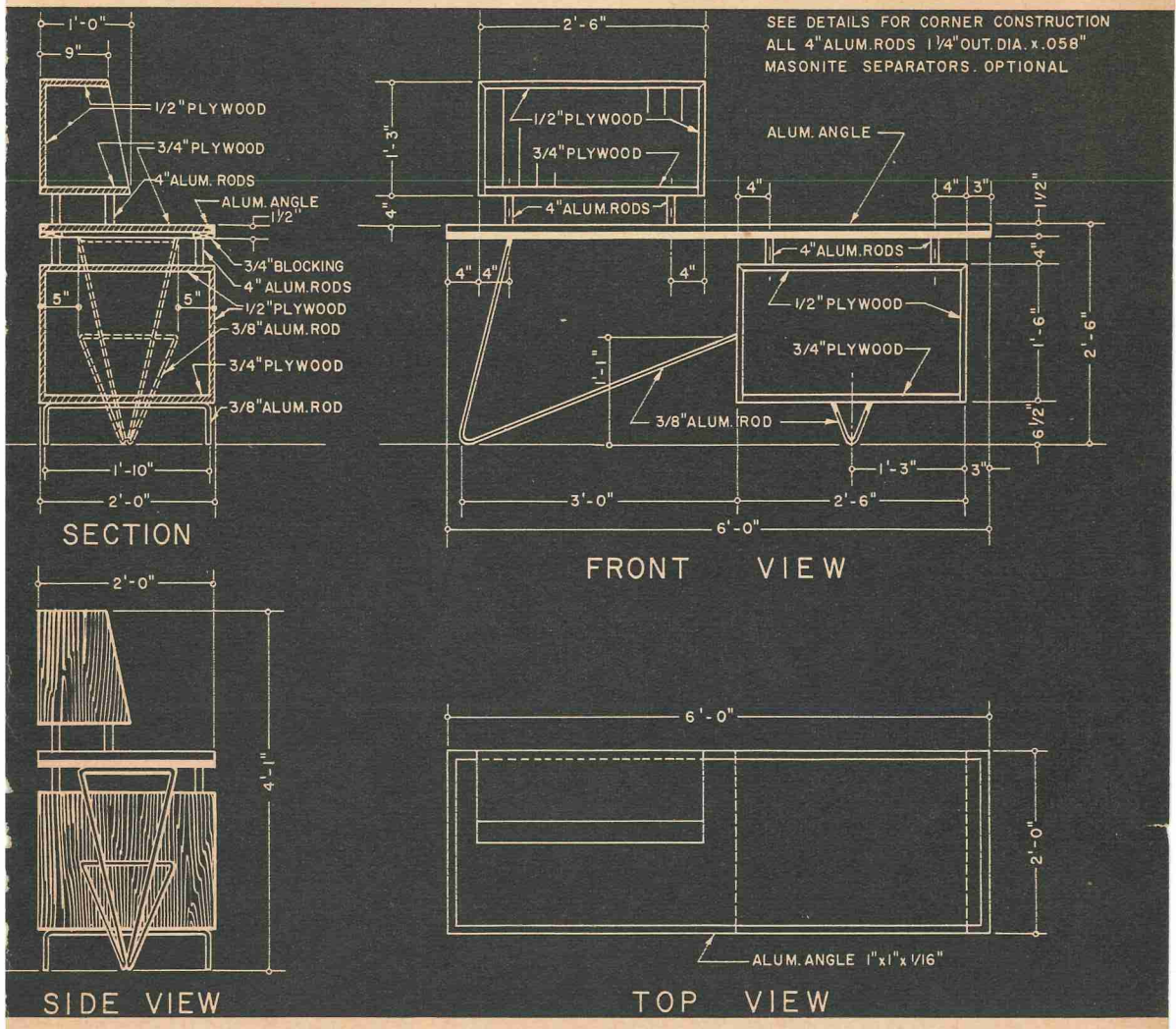
THE design of this desk skillfully utilizes large rectangular shapes together with triangular and smaller cylindrical ones. The light, gleaming aluminum also offers a sharp contrast to the dark wood of the desk top and the masonite separators in the upper, file box.

A feature worth noting is that the wood parts can be quite inexpensive. The two box-like structures are made of plywood. The top of the desk can be made of a solid hardwood, or of cheaper wood covered with veneer. Formica or linoleum of a modern design could also be used. The plans call for aluminum tubing (with dowel inserts) to be used to separate the desk top from the two box-like structures. Instead of tubing, however, solid rods or bars might be artfully shaped and used.

DESK TOP

As the desk top is just two feet wide, you can easily make it with three boards (¾ x 8 x 72 inches) doweled and glued together. Reinforce the top with a frame, or blocking as it is called here, made from ¾ x 4-inch stock. Glue and screw this frame to the underside of the desk top. After planing the edges and squaring the top, chamfer the top edges to permit the angled surfaces of the aluminum edging to sit flush against the wood.

Admittedly more decorative than functional, this striking desk of ultra-modern design will add beauty and excitement to any setting.



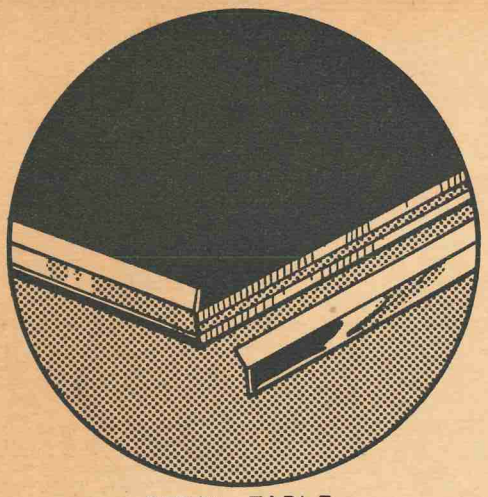
As the aluminum angle (1 x 1 x $\frac{1}{16}$ inch) can be purchased in 6-foot lengths, just carefully miter both ends of two 6-foot lengths to cover front and back edges. Then drill holes and secure the angles to the desk top with wood screws. The ends of the desk top are covered in the same manner. Saw the two end pieces to exactly match the mitered ends of the long side pieces.

THE BOXES

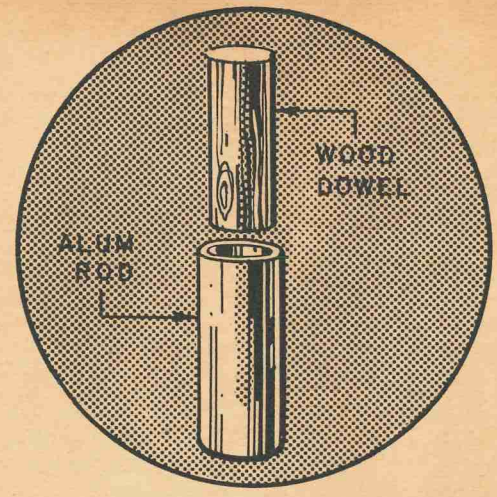
You'll need two thicknesses of plywood: ½-inch stock for the top, two sides, and back of each box, and ¾-inch stock for the bottom. Cut your pieces to the correct over-all dimensions; then, tilt either the arbor or the table on your saw 45° and saw the end of each board for a miter joint. The joints shown here are the key-and-slot type. Other joints can be used of course. The boards are then glued and clamped together. After the glue has dried, plane the front edges of the boxes carefully.

Note that the top and bottom boards of the upper box have been sawed to admit removable masonite separators. This must be done of course before glueing and clamping the box together.

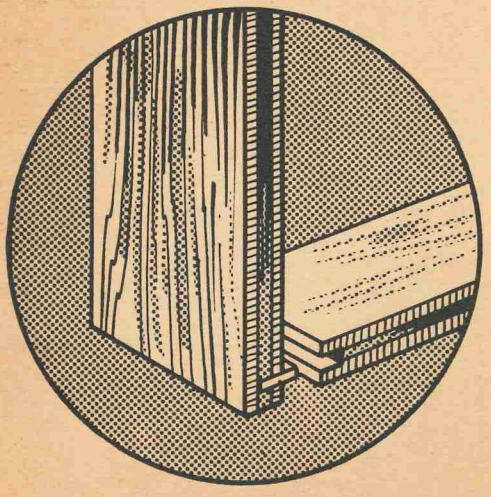
The bottom box, as shown here, is finished quite simply on the inside. You may wish to add shelves or separators. These can be made of solid stock, plywood,



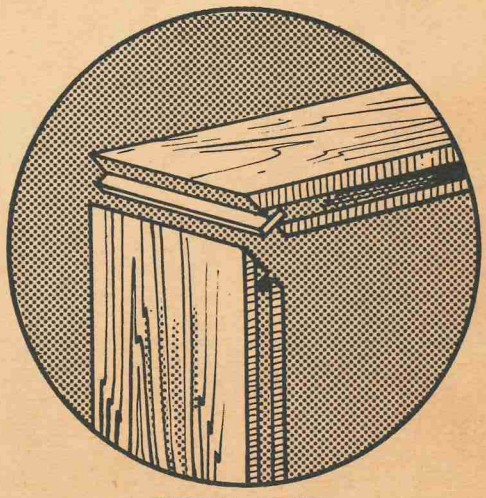
DETAIL TABLE
CORNER CONST.



DETAIL 4" RODS



DETAIL BOTTOM
CORNER CONST.



DETAIL TOP
CORNER CONST.

or even plastic. Many other changes can also be made to suit the decor and the taste of the individual craftsman.

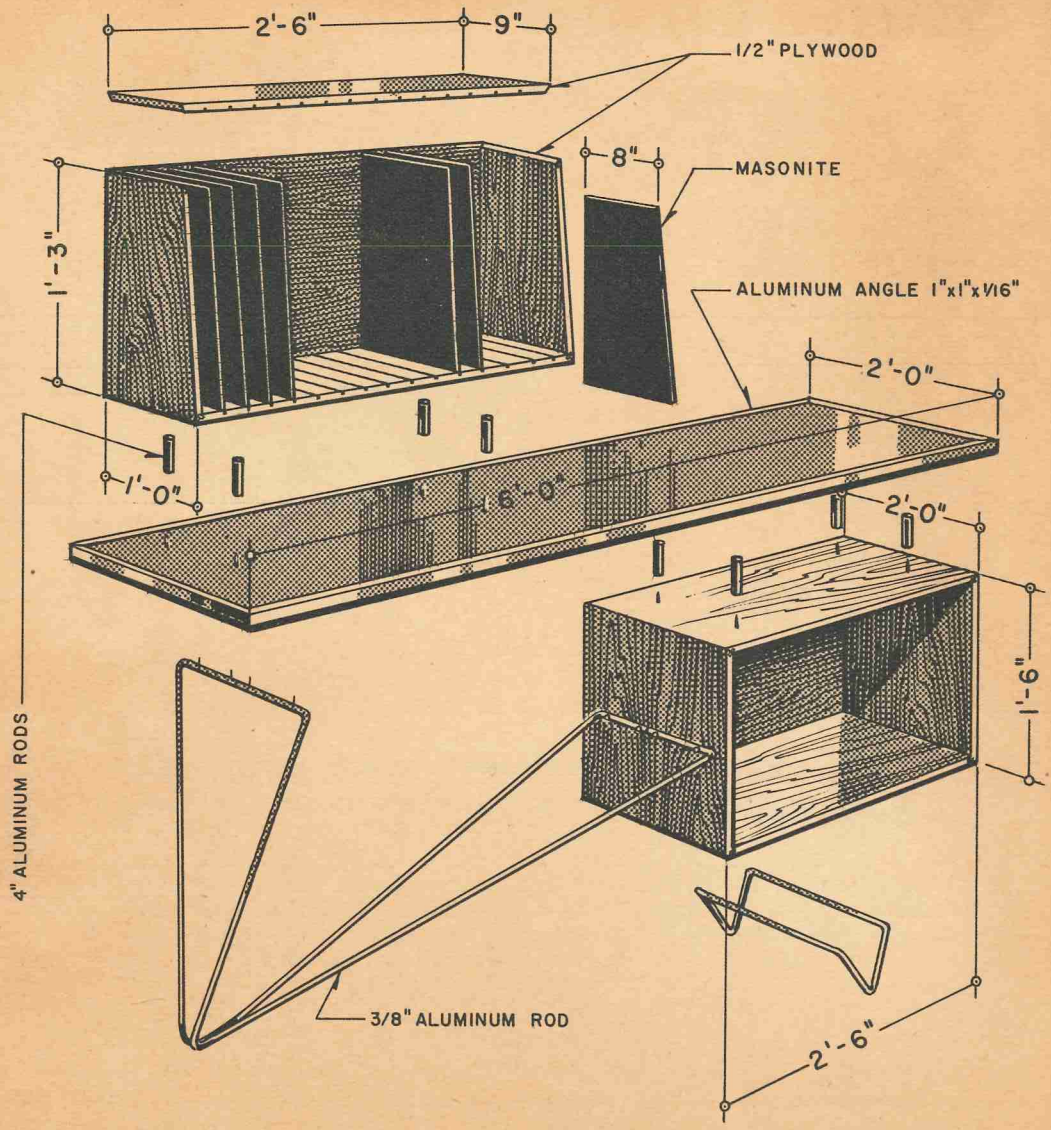
A heavier and even stronger construction can be obtained if the bottom box is lined with either another piece of veneered wood or solid stock. If such a liner is used it may prove more effective to substitute machine screws for wood screws where the formed aluminum-rod legs are fastened to the box. The nuts and washers on the inside of the box could be adequately covered with the liner.

Glass or plastic sliding doors can also be installed if grooves are sawed in the front edges of the box.

SUPPORTS

There are eight of these supports which separate the desk top from the two box structures. Each length of aluminum has inside it a large maple dowel rod. The dowel rod should extend at least ¼ inch up and down into dowel holes bored in the facing wood surfaces. This will give you a greater gluing area and add rigidity to the desk. Screws should also be used in the ends of the dowel supports, securing them from above and below. Be sure to drill large enough pilot holes for these screws.

An alternate method of fastening these supports between the desk top and the



boxes is to use carriage bolts or other long metal fasteners. If such fasteners are used, the head should be hidden. On the top box this means that a hole must be counterdrilled for each head deep enough to allow a wooden plug to be inserted over it. On the bottom box, the bolt heads can be hidden by drilling the bolt holes only through the frame or blocking which runs underneath the desk top.

ALUMINUM ROD LEGS

These legs are ⅜-inch round stock and can be formed easily on a piece of pipe held in a vise. Since the rods are purchased in 8-foot lengths, the legs are made in two matching pieces. After forming, place in position against the desk and mark for screw attachment. Centerpunch carefully before drilling holes. Mark the desk and drill pilot holes before screwing rods in place.

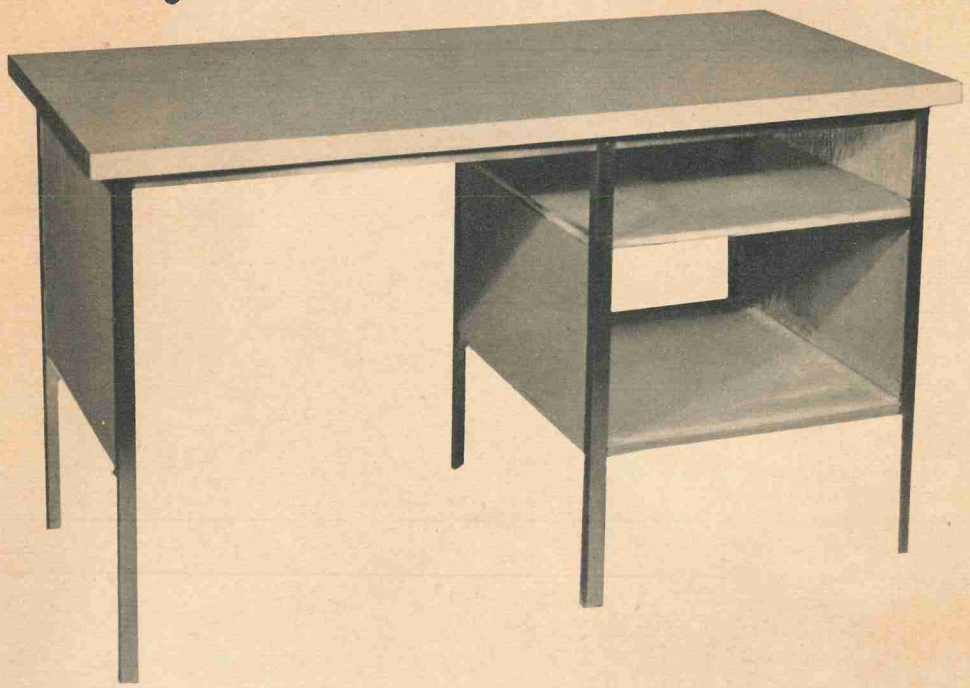
The shorter leg under the lower box of the desk can be formed from a 6-foot length of aluminum rod.

FINISHING NOTES

The aluminum can be brightened and finished with fine steel wool.

The finishing of the wood, of course, is a matter of taste and of making the desk fit into the decor of a room. •

Study Desk



This study desk of contemporary design is quite simple to build, especially if you make the desk top from a cull or solid wood door.

"WHEN is a door not a door?" The riddle is old, but the answer, "when it's a desk top," is as new as Do-It-Yourself Aluminum. As a matter of fact you can use almost any cull or solid door. It will have to be cut to size, of course. The edges can be dressed and sealed easily with thin strips of solid wood. Just glue your strips and tack them on with finishing nails. Anchoring this top to the metal frame is a relatively simple job, too. After making the frame, turn the door-top upside down, place the frame in the correct position, mark the hole locations carefully, and then drill large enough pilot holes for the aluminum self-tapping screws.

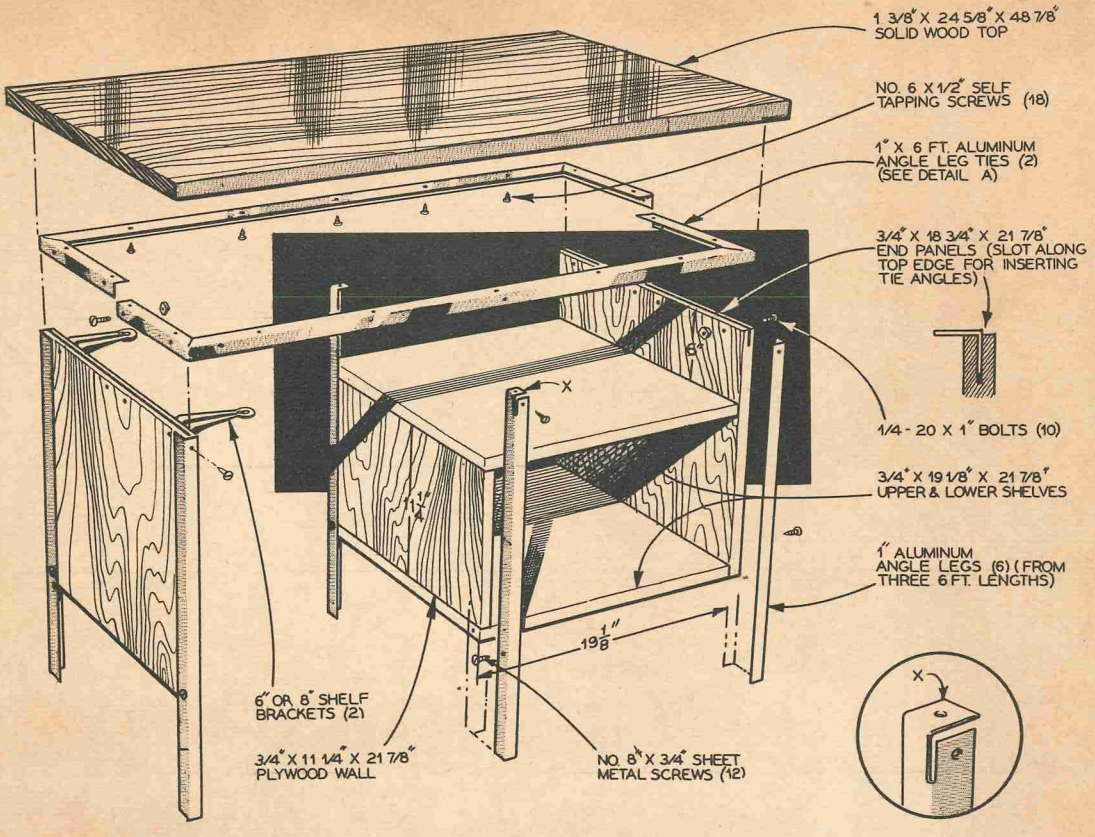
Begin the job, however, by making the metal frame and leg pieces first. Then measure your frame and cut the wood pieces to fit. Proceeding in this order will help to eliminate the effects of any errors which have occured in the sawing and bending of the metal frame.

The metal frame on which the door-top rests is made from two pieces of one-inch aluminum angle. These pieces should be 68 inches long. Draw the corner mitres accurately before sawing. The holes for the self-tapping screws should be laid out and drilled last.

Next, saw the four corner legs and the two center legs to the proper length. The two center legs are 1¼ inches longer than the other four. These two center legs must be sawed and formed in a vise. The holes at the top of the legs are for machine screws and should be marked and drilled last.

The basic wooden box pictured here can be constructed and fastened together with glue and finishing nails. Use small L-shaped braces sawed from your aluminum angle stock to provide a resting place on each leg for the wooden box. A ½-inch machine screw will hold each brace to a leg. The sides of the box can be held to the legs with ¾-inch sheet metal screws.

Both large end panels have a slot along the top edge into which the aluminum angle is inserted. These panels are anchored to the aluminum angle with one-inch machine screws. Drill the holes for the screws in the wood panels first and then mark their location on the angles before drilling. If cabinet clamps are available, the angle can



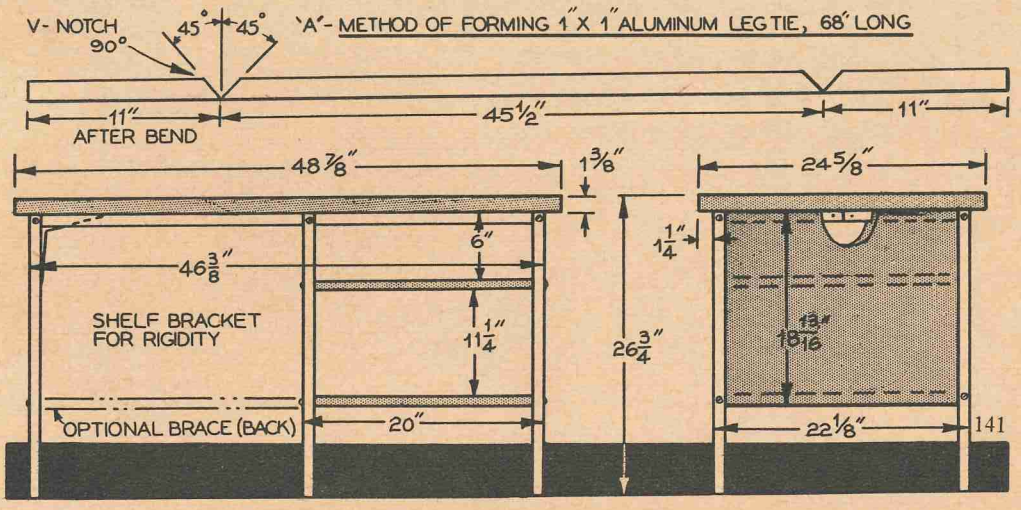
be clamped into position and the holes drilled through wood and metal in one operation.

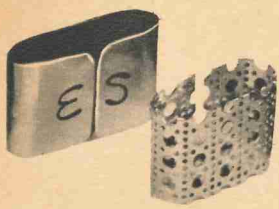
Two shelf brackets, 6 or 8 inches long, screwed to the top and end panel at the knee-hole end of the desk will provide additional rigidity and strength. Place them out of sight and close to the leg on each side of the desk.

You may wish to add an additional brace across the knee and leg space of the desk. This should be placed at any point lower than the center of the end panel. This brace can easily be made of 1x1-inch aluminum angle with the ends bent to 90 degrees and then screwed to the wood panels. A solid bar, ¼x1 inch, with each end formed to 90 degrees, can also be quickly formed and drilled for this purpose.

The suggestion here that a door be used for the desk top does not exclude, of course, the possible use of any solid lumber or thick plywood for this purpose.

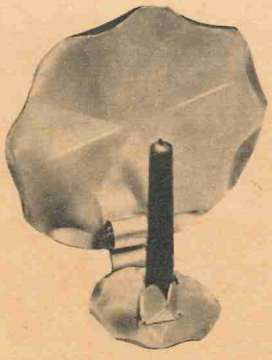
The application of a finish to the wood panels and desk top can be done either before or after the assembly of the desk. •

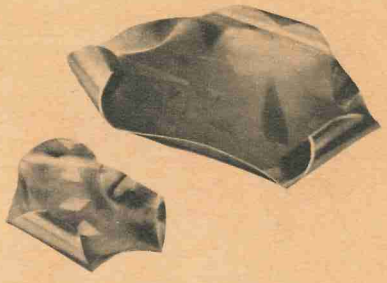


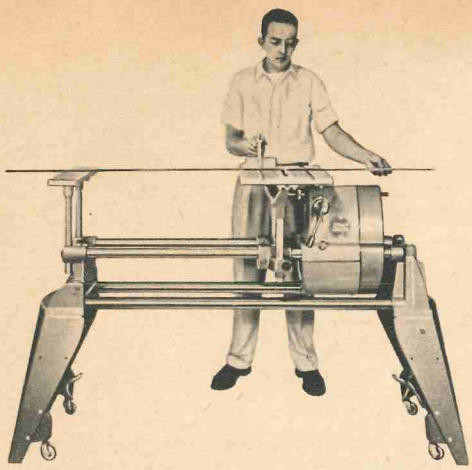


Gift Items You Can Make

SIMPLE cutting, bending, and finishing operations produce these attractive items from Do-It-Yourself Aluminum sheet in jig time. Once a few items like these have been made, it's great fun to work out your own designs. Curls are made by wrapping the metal around a wood dowel. Turned-up edges are easily and quickly bent up using a slotted block of wood. Masking off sections separately and sandpapering them lightly or rubbing with steel wool makes attractive surface finish patterns. •



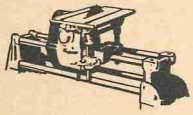




THE BEST POWER TOOL FOR DOING IT YOURSELF WITH ALUMINUM IS

SHOPSMITH*

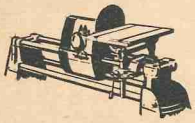
BECAUSE...



9″ Circular Saw

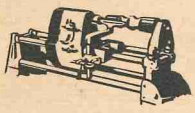
It saws! Powerful 9″ circular saw has separate Speed-Dial setting (700 to 5200 r.p.m.) for all metal-cutting operations. Fully adjustable extension makes effective table size 18¾″ x 56″ for big capacity jobs. Special 1¼″ saw arbor for quick blade changes.

It sands! Big 12″ sanding disc has 113-sq.-in. sanding surface. Quill feed for automatic duplication of work without repeated measurements. Speed-Dial setting for coarse, medium, fine sanding, all metal-finishing operations.



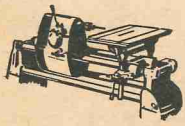
12″ Disc Sander

It turns! Infinitely variable Speed-Dial settings for turning a full range of diameters. Excellent as a lathe for metal spinning, freehand metal turning, etc. 34″ between centers. Tool rest slides parallel to work. Movable headstock for faceplate turning in convenient position at end of ways.



34″ Lathe

It bores! Unlimited capacity for horizontal drilling ends of long workpieces. Locking miter gauge and fence serve as jigs. Hairline accuracy with Depth Control Dial and rack and pinion adjustment of table height.



Horizontal Drill

It drills! Separate Speed-Dial setting for every operation from heavy-duty drilling to high-speed routing. Drills to center of 16½″ circle. 26″ chuck-to-table. 58″ chuck-to-floor. Levered table movement for light metal milling.

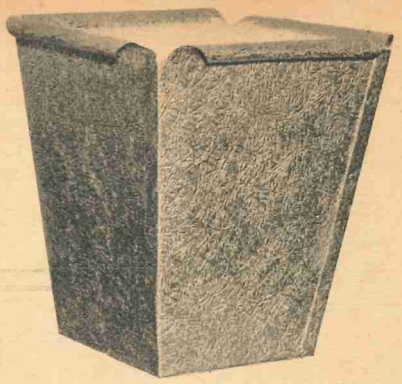
SHOPSMITH performs all the basic workshop operations on wood, metals, plastics. Power-Mount for easy addition of jigsaw and jointer. Extra spindles for wire brushes, buffing wheels, etc. On display at your hardware or local Montgomery Ward store. Comes complete, ready to plug in, with powerful ¾-hp. motor, chrome rust-proofing and bench. Only **$269.50**

16½″ Vertical Drill

Write for TWO FREE BOOKS—24-page booklet, "What to Look for When You Buy Power Tools," and 20-page SHOPSMITH catalog. MAGNA ENGINEERING CORPORATION, Dept. 292-X, at factory nearest you. 12819 Coit Rd., Cleveland 8, Ohio, OR Menlo Park, California.

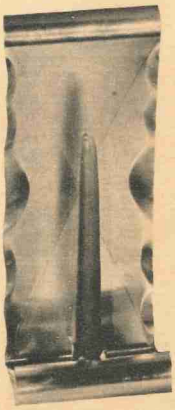
SHOPSMITH®

*Trademark Reg U.S. Pat. Off and in foreign countries

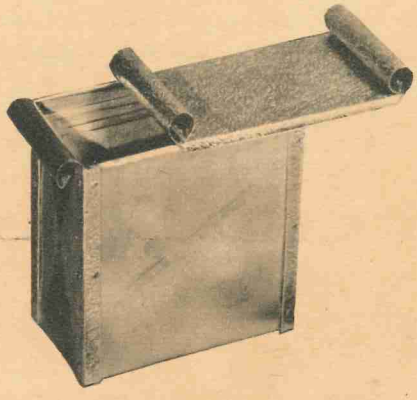


This waste basket can be made in almost any size. Form embossed sheet, then rivet wherever joined.

Roll candlestick holder ends with the aid of a dowel rod; use slotted block to turn up edges.



Record or recipe box is easily made of plain and embossed sheet aluminum; rivet corners to secure.



You can do-it-yourself better... when you start right here!

Now you can make things of metal using your own woodworking tools—with Reynolds *DO-IT-YOURSELF** Aluminum

You don't need special tools or special skills to work with Do-It-Yourself Aluminum. Ordinary hand or power tools easily perform all kinds of operations. And you have leading tool manufacturers' word for it—Do-It-Yourself Aluminum won't harm your tools. Most households already have all the equipment needed to saw it, cut it, plane it or bend it. If you can saw a board, drive a screw—you can do professional looking jobs with Reynolds *Do-It-Yourself* Aluminum.

Comes in convenient pre-formed shapes

Much of your home project work is already done when you purchase Reynolds *Do-It-Yourself* Aluminum. Your dealer's rack contains a wide variety of shapes—eight different kinds of aluminum sheets, plain, embossed, or perforated—tubing for clothes rods, legs, lamp bases—rod and bar for bracing, as decorative and construction elements—angles—specially formed sections for making window screens and storm sash plus needed hardware—trim strip and all kinds of fasteners—and Reynolon plastic film.

Gives projects added beauty and usefulness

Do-It-Yourself Aluminum is true aluminum—amazingly light and strong. It will never rust, resists corrosion, keeps its shining good looks for years and years. Your Do-It-Yourself projects are permanent projects—permanently handsome, permanently useful.

Reynolds *Do-It-Yourself* Aluminum is available at leading hardware and building supply dealers.

REYNOLDS
*DO-IT-YOURSELF**
ALUMINUM

*T. M. REYNOLDS METALS COMPANY

Reynolds *Do-It-Yourself* Aluminum is also available in Canada.

Reynolds Aluminum Service Corporation
2499 South Third Street, Louisville 1, Kentucky

- ☐ Enclosed is 50¢. Please send me Project Book No. 1—132 Do-It-Yourself ideas.
- ☐ Please send me complete information on Reynolds *Do-It-Yourself* Aluminum.
- ☐ Please send me FREE list of Patterns and Plans.

Name_____

Address_____

City_____ Zone____ State_____

HOW-TO DO EVERYTHING

with FAWCETT HOW-TO BOOKS!

HOBBIES

Frank Ellison on MODEL RAILROADS (No. 242)

Lucian Cary on GUNS (No. 238)

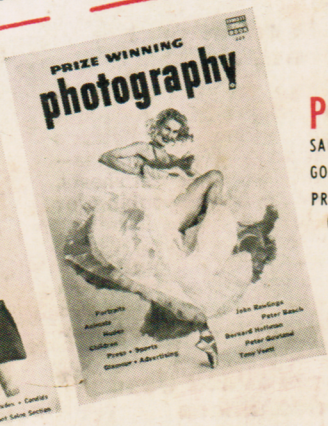
HI-FI Manual (No. 232)

WORKSHOP

Handy Man's Indoor and Outdoor PLYWOOD PROJECTS (No. 245)

BUILD IT (No. 240)

How To REFINISH FURNITURE (No. 236)



PHOTOGRAPHY

SALON PHOTOGRAPHY (No. 243)

GOOD PHOTOGRAPHY (No. 235)

PRIZE WINNING PHOTOGRAPHY (No. 227)

(See inside front cover)

AT YOUR FAVORITE NEWSSTAND • 75¢